YOUNG CHILDREN'S THINKING IN HISTORY

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Abstract

Theories of cognitive development relevant to children's thinking in history are examined and previous research relating these to history is discussed. No agreed patterns of development in historical thinking which are based on cognitive psychology have so far been found, and the early stages of children's historical thinking have not been adequately examined.

An experiment was set up to investigate young children's ability to develop arguments about a variety of historical evidence. Two groups of twenty eight-year-old children were taught four periods of history over two terms, as part of an integrated curriculum, by the researcher who was their class teacher. Teaching strategies were based on 'direct' experience (visits to sites and museums), and discussion of key evidence using taught concepts. These experimental groups were compared with a control group in another school, taught the same four periods as the experimental groups, by an experienced teacher, using his own methods.

At the end of each unit, the control and experimental groups were given a written test to assess their ability to make deductions about evidence related to the period but previously unseen. The first experimental group also made tape-recordings of discussions of the evidence, led by the teacher. In the second experimental group discussions, no adult was present. The experimental groups were also tested on their ability to write stories based on their knowledge of this period.

Assessment scales based on cognitive psychology and previous research were devised.

Findings suggested that children were able to make a range of valid deductions about pictures, artefacts, diagrams, maps and writing, using learned vocabulary, and that they could recognise a distinction between certainty and probability. Discussions were more wide-ranging than written answers, whether an adult was present or not. It was suggested that through learning to make a range of valid suppositions about evidence, children begin to consider the attitudes and ideas of other societies. Teaching strategies are significant in developing children's historical understanding.

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INTRODUCTION

"Quadruped. Graminivorous. Forty teeth, namely twenty-four grinders, four eye teeth and twelve incisors. Sheds coat in spring; in marshy countries sheds hooves, too. Hoofs hard but requiring to be shod with iron. Age known by marks in mouth...."

This was the definition of a horse which Mr. Gradgrind required from Bitzer. "Facts. Teach these boys and girls nothing but facts. Facts alone are wanted in life. Plant nothing else, and root out everything else....he seemed a galvanizing apparatus, charged with a grim mechanical substitute for the tender young imaginations that were to be stormed away...." Hard Times.
Charles Dickens. 1854

Dickens' anger is not irrelevant today. Many agree with Professor Alan Beattie (1987) that children should be taught the 'facts' of history, and not encouraged to discuss the 'whys' and 'ifs'. Yet children cannot understand history unless they understand the processes of enquiry which constitute knowledge in history (Lawton 1975, Pring 1976, Bruner 1966). They must understand the kinds of questions to ask, and the ways in which to answer them. The following are extracts from discussions by eight-year old children, in 1987, about a picture of the Iron Age Chalk Horse at Uffington in Berkshire (Appendix XX). They are discussed in Chapter Three, B4.

"It looks like a bird."

"It's a horse."

"They could draw horses."

"So they had horses."

"They might have rode them - or used them for work."

"There must be a lot of chalk near the surface."

"So there wouldn't be trees like oak trees here - not many trees."

"They could live on the chalk - it's well-drained - the water would run away."

"The soil would be thin - easy to plough."

"Whatever tools they used, they must have been able to dig down into the ground to get to the chalk."

"It must have taken a long time to make - maybe centuries."

"They were hard workers...skilful...artistic..."

"They co-operated."

"They lived in a community."

"It's not an ordinary horse. It's much different from the ones we see."

"It must be a special one or they wouldn't go to all that trouble."

"It's probably a symbol for something - a clue."

"To bring a good harvest?"

"A symbol of strength?"

"To an enemy. Perhaps the horse brought bad luck so they stayed away."

"Perhaps if someone was ill they prayed to it. It gave them power when they were ill."

"Or perhaps they just did it for fun."

"Maybe they danced around it - or put fires on it and burnt something - maybe for the chief's birthday."

"I don't think they had birthdays."

"But they had beliefs and ceremonies."

"Customs."

These children discuss the geology and the social organisation needed to make the horse, its practical and symbolic significance. They follow

through and weigh each other's points, form imaginative ideas into logical arguments. They synthesize them using abstract concepts: co-operate, community, ceremonies, beliefs, customs. They make a distinction between what they know and what they can only speculate about.

It is important to establish history as part of a broad, Primary curriculum. Martin Booth (1969) argued that we are part of our past experience, and we must seize all possibilities to perceive, grasp and possess this understanding by introducing children to history in such a way that it impinges on their consciousness and becomes part of their experience, so that they may be more truly themselves. Certainly history fulfils the criteria of Bruner (1963 pp 52) for any subject taught in a Primary School, that when fully developed, it is worth an adult's knowing, and having known it as a child, makes a person a better adult.

Yet the ORACLE survey (Galton, Simon and Croll 1980) showed the Primary curriculum to be dominated by mathematics and language exercises, and H.M.I. Reports (1978, 1982, 1986, 1989) have shown that even in Primary Schools where history is taught, it is often superficial, based on stories and copying from poor text books.

It is also important to establish patterns of development so that progress can be planned and monitored. The need to articulate aims and methods was stressed in the Black Papers (Cox and Dyson 1969, 1975), yet Povey (1980), showed that teachers are not good at evaluating children's thinking processes.

The National Curriculum for History is intended to establish history within the Primary curriculum. However, there has been little research on which to base the statements of attainment for history, and if young children are to begin to understand, in an increasingly complex way, the thinking processes which lie at the heart of historical understanding, teachers need to explore the methods by which this may be achieved.

This study investigates, firstly, whether it is possible to teach young children to become actively involved in historical problem-solving. This poses difficulties, because even concrete evidence can only be interpreted through argument, using language which may be unfamiliar and abstract. Interpreting evidence also involves understanding ideas, attitudes and values of other societies. Secondly, given that it is reasonable to suppose that it is possible to teach children to think in an historical way, it investigates how they may best be taught (what evidence should they be given, and what questions should they ask about it?), what patterns of development we can expect, and how we can evaluate their responses to this teaching.

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CHAPTER ONE

A REVIEW OF THE LITERATURE

A. DEFINING HISTORICAL THINKING

As David Thomson (1969) explains, history has developed over the last two hundred years from chronicles of unrelated events, into a discipline which aims to interpret different kinds of evidence in order to understand societies in the past. Its content is diverse - social, economic, constitutional or aesthetic. It may be concerned with individuals, institutions or groups. Philip Phenix (1964) sees history, with religion and philosophy, as forming a sixth 'Realm of Meaning' which unites all other kinds of thinking, and which he calls 'synoptic'. It is the questions historians ask, and the ways in which they answer them, which distinguish history as a discipline. Historians interpret traces of the past, the evidence, through a process of deductive reasoning, but evidence is often incomplete and, for this and other reasons, a variety of interpretations are possible, within publicly accepted criteria. Producing a range of valid interpretations involves thinking, which we may call 'historical imagination'. A wide and perceptive range of valid interpretations leads to the achievement of 'historical empathy'.

The relationship between deductive reasoning and historical empathy will be discussed in Chapter One (A2 (i)). Both deductive reasoning and historical empathy are rooted in the language of history.

Each of these three aspects of historical thinking, deductive reasoning, historical empathy, and historical concepts, will be examined in turn. In each case, relevant work in cognitive psychology will be considered, and its application to research into children's historical thinking will be analysed.

A1. DEDUCTIVE REASONING

(i) Deductions from historical evidence.

There are many kinds of historical evidence: artefacts, pictures, plans, maps, writing. Making historical deductions involves forming arguments about the significance of a piece of evidence: what does it tell us about the society that produced it? How was it made? Why? What was it used for? By whom? Where was it found? Are there others?....and so on.

Superior examples of Roman shoes found at Vindolanda, the equivalent of shoes by Gucci or Lobbe today, tell us something about the social and economic structure of the fort. A letter from a first generation 'Dutch' Roman at the fort, written in Latin, asking for underpants and socks from Rome, may tell us about the economic and transport systems of the empire and the attitude of the Dutch tribes to cold, clothes and culture.

Since there is a limit to what can be known for certain, an historian must also make deductions which are probabalistic - reasonable guesses about the evidence; e.g. the four post holes in the centre of the Little Woodbury Iron Age house plan may be the principal means of supporting the roof (Bersu, G. 1940); they may surround an open courtyard where animals could be kept (Clarke 1960), or they may be a free-standing tower for repairing the roof (Harding, D.W. 1974). If, therefore, evidence is incomplete, the historian must also be able to accept and tolerate that which can never be known; e.g. we do not know how much of a new style of agriculture the Romans introduced in Britain, or how it was related to the old and so how British communities related to Roman villas, since no examples of Roman field patterns have been identified (Richmond, I.A. 1955).

This process of enquiry in interpreting historical evidence was clarified by R. G. Collingwood in his autobiography (1939). As a young philosophy teacher he had rejected the methods of the 'realists' who proceeded from logical propositions which could be proved true or false; Collingwood saw enquiry as beginning with a complex of ordered, specific questions, in the tradition of Plato, Bacon, Descartes and Kant. He said that philosophy had found it necessary to accommodate a revolution in thinking about the natural world, based on empirical observation and deduction in the seventeenth century, and that it must encompass a similar revolution in the way it studied man in constantly changing societies.

Collingwood worked out this philosophy of history through constant practical application in archaeology. He proceeded from specific questions about the significance and purpose of objects, to the people who made them, whether they were buttons, dwellings, or settlements. Although he does not state this clearly, the examples he gives of such enquiries show that this sequence always proceeds from asking first what is known about the object, then what can be guessed and finally, what he would like to know in order to support, extend or contradict his guesses. For instance, he knew from concrete evidence that a Roman wall from the Tyne to Solway existed. He guessed that its purpose was to form a sentry walk with parapets as protection against snipers. He wanted to know if there were towers as a defence against vessels trying to land between Bowness and St. Bees, in order to support his guess. As a result, a search revealed that towers had been found, but their existence forgotten (because their purpose was not questioned). Similarly, Collingwood knew that the populations of Caerwent and Wroxeter were high during the beginning of the Roman occupation, but soon fell. He guessed that this was probably due to a short-sighted policy of

urbanisation by the central government. He wanted to know if this population trend was true of other towns, in order to support his guess. Excavations proved it was.

Interpreting historical evidence involves not only internal argument, but debate with others, testing deductions against evidence from other sources and accepting other points of view. It means, then, supporting opinions with arguments, accepting that there is not always a 'right' answer, that there may be equally valid but different interpretations, and that some questions cannot be answered. This kind of thinking is as important to the social, emotional and intellectual growth of young children as it is necessary in adult society.

A1. DEDUCTIVE REASONING

(ii) Theories of cognitive development relevant to deductive reasoning in history

Piaget posits a sequence in the development of logical thinking which encompasses three qualitative stages. During the pre-operational stage, thinking is dominated by intuitive trial and error, and by a child's own experiences and feelings. At the next stage of concrete operations, he is able to take in information about the tangible and visible world, fit it into his own mental patterns - adjusting these sometimes to accommodate new information - and so store it, in order that he can use it selectively to solve problems. He is therefore able to form a reasoned premise and support it with a logical argument. At the third stage of formal operations, he is able to think in terms of abstract, positive and negative propositions (if...then; either...or; when...is not; both...and), and to weigh all the possible variables in an argument.

Most of Piaget's work cannot be directly applied to history because it is concerned with manipulating physical objects in a scientific way. The books on probability and chance (1951) and on geometry, dealing with the interpretation of maps (1960), are probably more relevant than those on time (1956) or causality (1930). Piaget's work on probability (1951) shows, at a pre-operational level, no differentiation between chance and non-chance; at a concrete level, increasing awareness of what we can know and what we can guess; at the formal level, the adolescent establishes a firm bridge between the certain and the probable. This research, however, was done using only physical material and mathematical experiments. Since historical evidence, whether concrete or abstract, can only be interpreted though logical argument, Piaget's work on language (1926) and logic (1928) seems the most helpful to apply to the development or deductive reasoning in history. From there, it is possible to piece together a valid sequence. In 'The Language and Thought of the Child' (1926), Piaget says that, at the egocentric level, the child is not concerned with interesting or convincing others, and leaps from a premise to an unreasonable conclusion in one bound. Next, he attempts to communicate intellectual processes which are factual and descriptive, and show incipient logic, but this is not clearly expressed; he calls this 'adapted information'. This leads on to a valid statement of fact or description. From this follows a 'primitive argument' in which the statement or opinion is followed by a deduction going beyond the information given, but the explanation for the deduction is only implicit.

At the next stage, the child attempts to justify and demonstrate his assertion by using a conjunction (since, because, therefore), but he does not succeed in expressing a truly logical relationship. Piaget says, in 'Judgement and Reasoning in the Child' (1928):

> "The young child (7-8) rarely spontaneously uses 'because' or 'although', and if forced to finish sentences using them, uses them as a substitute for 'and then'."

The child eventually arrives at 'genuine argument', through frequent attempts to justify his own opinions and avoid contradiction, and as the result of internal debate; he is able to use 'because' and 'therefore' correctly to relate an argument to its premise, by an appeal to his own authority and that of others. At the formal level, he is able to use not only conjunctions, but also disjunctions, implications, and incompatible propositions.

This pattern in the development of argument has been examined, assessed and modified by subsequent research. E. A. Peel (1960) identified a 'describer' stage of unjustified and unqualified statements, a transitional stage of justified hypotheses and a recognition of logical possibilities, and an 'explainer' stage of weighed arguments using abstract propositions. Nevertheless, children's apparent inability to think logically often seems to be due to lack of knowledge or experience or failure to understand the kind of thinking that is expected. Moreover, Peel's assessment scales do not examine sufficiently the thinking processes on which a child's answer is based. For example, Peel (1960 p. 128) read the children a story about Sicilian Medieval History, then asked if King Henry was a religious man. He classed a 10 year old boy as pre-operational because he said that King Henry was religious since he swore to fight in a crusade, yet did not know why he failed to do so.

It is particularly difficult to apply Piaget's pattern of reasoning consistently to historical evidence because thinking in history can operate on several planes (horizontal decalages) depending on the

complexity of the evidence; Piaget and Inhelder themselves (Peel 1960) found levels of thinking varied according to the questions asked. The child's interest and involvement are also important, as Beard (1960) showed; Susan Isaacs (1948) found very young children capable of logical argument if they understood how to tackle it and were interested in the problem, as did Margaret Donaldson (1978). Wheeler (Peel 1960), too, found that logical reasoning can exist from an early age. He considered that it becomes more complex through increased experience and memory, rather than through qualitative changes in thinking. Indeed, Terman and Merrill (1960) show that you can expect all stages at all ages! Piaget's own case-studies offer some evidence that comments, suggestions and criticisms make pupils aware of the elements in problem-solving and can accelerate their progress.

Denis Shemilt (1980) tabulates the arguments for and against applying Piagetian developmental psychology to history. In his view, the chief problem is that so far there has been insufficient research which applies it to history to make general conclusions possible. The sequence in which ideas about change or causation develop varies, according to test and content; children may appear to reason in history by free encounter of ideas, but their associations are often related to the concrete world, their analogies may simply reflect their unfamiliarity with propositional forms, and, anyhow, not all their reasoning is associational. Shemilt concludes that, at the moment, we are less able than Piaget was to define what counts as pre-operational, concrete or formal when using historical evidence.

Donaldson (1978) examined the dichotomy she recognised between children's capacity for deductive reasoning in informal, everyday situations, and Piaget's conclusion that children under seven have

little reasoning ability. Her overall aim was to destroy the assumption that most people are incapable of developing 'the pleasures of the mind' beyond immediate personal experience. She found that young children are capable of deductive reasoning, that their problem-solving depends on the extent to which they can concentrate on language, and that language development is related to other non-verbal clues which are also brought to bear in problem-solving.

She found that children rarely discuss the meanings of words, are easily distracted, and do not always select relevant items in problem-solving.

Donaldson concludes that understanding words is piecemeal, gradual and complex, and a child's understanding depends on whether the reasoning stems from him and his immediate concerns or is externally imposed, and also on the child's expectations of what the questioner expects.

She concludes that young children must be helped to develop their ability to reason and make inferences as early as possible by recognising the abstraction of language, by receiving the right kind of help in problem-solving, and in understanding the nature of different disciplines.

Piaget's sequence in the development of deductive reasoning then proceeds from intuitive trial and error, through the ability to form a reasoned premise and support it with a logical argument, towards the ability at a formal level to weigh all the variables in an argument. He also found an increasing awareness at the concrete stage of what can be known and what can be 'guessed'. Although subsequent research has modified this pattern, it suggests that young children may be helped to develop arguments about historical evidence if we teach them how.

It suggests that we need to provide interesting, memorable learning experiences, ask simple open-ended questions, and teach appropriate vocabulary.

A1. DEDUCTIVE REASONING

(iii) Research applying theories of deductive reasoning to children's deductions about historical evidence

There has not been a great deal of research relating patterns of development in historical thinking to theories of cognitive development. There have been no longitudinal studies. The evidence used has varied in complexity; often it has been written evidence. The questions asked have often been difficult, involving understanding of motive or bias. The responses have usually been written. For these reasons, the results have often been disappointing, and may have suggested that young children are not capable of active historical problem-solving. So far, no study has tried to define the simplest form of deductive reasoning which could claim to be genuinely historical, and no study has been based on class-teaching over a prolonged period.

In the 1960's, children's responses to written historical evidence were classified in terms of Piagetian levels by Lodwick (1958, in Peel 1960 p. 121), Thompson (1962), Peel (1964), and Booth (1969), Hallam (1975), and Rees (1976). On the other hand, Dickinson and Lee (1978) start with a philosophy of history in order to arrive at categories. Lodwick's study was, in some ways, the most useful for those interested in young children, because it asked questions about visual evidence, and did not depend on an understanding of individuals' motives or causation. Lodwick showed children between seven and fourteen a picture of Stonehenge and asked them three questions - for example: "Do you think Stonehenge might have been a temple or a fort?" Their answers showed a gradual development from unreason

to logic and supporting evidence, to probabalistic thinking, and, finally, they became able to form a negative hypothesis supported by evidence. At seven, they could see only one relation, and were not capable of reversing operations ("A temple because people lived in it."). Here the child leaps from a premise to an unreasonable conclusion. Piaget (1926) classifies this as egocentric.

At 9.7, answers were based on personally concrete material ("They might have been to stop the enemy charging through. The bricks would stand up. The enemy could not charge through quick enough and would be killed?"). Here the child tries to justify his own opinion. Piaget (1926) calls this primitive argument. By 10.5, the thinking was reversible and explanatory though still in concrete terms ("There was not a war when Stonehenge was being built. There were no battles before Jesus."). Piaget (1926) shows this as the next stage, when the child still does not succeed in expressing a truly logical relationship.

At 14.0, a child could form an hypothesis and test this against data derived from the picture and the explanation ("I think it was a temple. There was a round formation at the top end, and at a certain time of the year, the sun shines up a path to the altar, and I think it was used for worshipping the sun god. There's no roof on it so the sun shines right through. There's a lot of work in it for a God - in fact they brought the blue stones from Wales."). At 14.11, a child could also support the hypothesis that it was not a fort, and support it from evidence in the picture ("It seems rather open for a fort. It's not large enough, and you would not need a fort in the middle of Salisbury Plain. It's deserted."). This pattern of development that Lodwick traces reflects Piaget's levels, although no answer reflects the 'genuine argument' stage, which Piaget (1932) describes, before fourteen years. The answers also seem to owe their more developed reasoning to an increase in knowledge. If the children

had experienced more discussion of the neolithic period, their answers might well have achieved 'genuine argument' at an earlier age.

Donald Thompson (1962) gave a mixed ability class of twelve-year old boys background information about William the Conqueror, then gave them an extract from the Domesday Book and from the Anglo-Saxon Chronicle, and asked them why William had the survey carried out. The material is thus more complex than that of Lodwick (it is written and involves comparing two sources and bias), and the question is more difficult (because you must understand the King's motives in relation to the social organisation at the time). Thompson found three levels of response. Replies at a pre-operational level showed misunderstanding and tautology; at a concrete level children could see the relationship between the parts and the whole and reverse their thinking by checking it, but would simply repeat information given in the chronicle and ascribe motives without evidence; formal responses showed awareness of uncertainty and probability and understanding of his insecure situation and need not to be cheated of taxes. However, Piaget relates the term pre-operational to physical experiments - predicting the colour of marbles to be drawn from a bag, in a random way, for example (Piaget 1951). His work on rules, and motives (1932), shows that by twelve years old, children understand that rules can be changed; they take account of motive and see that justice is relative. Piaget says this is achieved through comparing and discussing perspectives. Although Thompson did reveal a Piagetian sequence with a narrow age band, he seems to have found a low level of response because of the abstraction and complexity of the material, and also, perhaps, because he required a written response.

E. A. Peel (1964) traced the same three Piagetian levels of response, pre-operational, concrete and formal, amongst a group of Junior School children when he told them the story of King Alfred and the cakes and asked, "Could Alfred cook?" Pre-operational responses at seven years old were illogical and unrelated ("Yes, he was King." Or, "No, he could fight."). At the concrete level, they would restate evidence from the story; at a transitional level, they may state what might be expected ("I shouldn't think so - at least, not as well. He didn't pay attention to the cakes. If he had been a good cook, he might have known they'd be done."). At a formal level, a possibility not stated in the text occurs ("I don't know, because if anyone could cook and had something else on his mind, he might still forget the cakes.").

It is not surprising that the same levels of response could be found amongst different age groups, because Peel's material is so much simpler. Indeed, it is hardly an historical question, and requires no understanding of laws, motive, bias or of another society. Again, Piaget's terminology, formulated in relation to physical experiments, is not very helpful. Peel's responses might have been analysed in a more refined way if they had been based on Piaget's sequence in 'The Language and Thought of the Child' (1959): egocentric, adapted information, statements of fact, primitive argument, incomplete causal relationship, the genuine argument. This sequence would have been more precise, reflected the simple question, and been appropriate for age-range.

Martin Booth (1969) constructed tests for a group of fifty-five 13-14 year olds, designed to explore the nature of their knowledge of history. They were asked questions about time and change

and about the attitudes, ideas and beliefs represented by three religious buildings of different periods. They were also asked to compare and contrast people, events, and photographs of houses of different periods. Booth found that answers fell into three categories: those that had little or no comprehension of the material or the question; those that referred to the information given but made little attempt to refer to historical material outside the question; and those that showed selection, critical thinking and related their work to relevant material outside the material given. He subdivided these categories on a 10 point scale.

The evidence provided in this test was more complex than that in Donald Thompson's study (1962), and demanded a range of different historical skills. Yet because of the complexity of the material and questions, the same broad bands of response emerge, from illogical, to repeating the information, then weighing and synthesizing it. Piaget (1926) relates these, in the context of simple material, to much younger children. It seems that researchers try to fit their children's responses into Piaget's three bands, irrespective of age group or material, rather than ask simple, open-ended questions and see what patterns emerge.

It is interesting that Booth found more divergent thinking and flexibility when the children were asked the questions orally, and pupils' questionnaires showed that they enjoyed class discussion, local history studies, and examining pictures, documents and maps, and disliked facts, generalisations, and 'essay' writing. (This information was borne in mind in designing this study).

Disappointed by the findings of the 1960's, experiments or strategies were designed in the 1970's to see if children's thinking in history could be accelerated within the Piagetian model, by teaching methods. Roy Hallam (1975) worked with nine and thirteen year olds, and Allun Rees (1976) with twelve year olds. Hallam taught 'experimental' classes and 'control' classes and questioned them at the beginning and end of the year. The experimental classes were taught through active problem-solving in role-play ("Imagine you are Henry VIII and say why you have decided to abolish the monasteries."), cloze procedure using Cromwell's diary, and discussion of passages from historical texts. He found moderate degrees of consistency in historical and Piagetian tasks, and that success in understanding the passages was not just due to facility in using words, but to whether children had the appropriate schemes, such as class inclusion and seriation, to make the passages meaningful.

Nevertheless, it seems again that, although the research is looking at the quality of children's thinking in history, and not simply at fact acquisition, the emphasis of the framework is on a Piagetian model which relates only broadly to historical thinking skills, rather than investigating the nature of historical thinking. However, Booth had found that children enjoy discussion, and Hallam found the classes which were taught through active problem-solving performed at a higher level than the traditionally taught control group.

Allun Rees (1976) also found that children's thinking skills in history could be developed if they were taught to explain rather than describe, and to be aware of uncertainty of motive by switching perspective. His class was matched with a control class who were taught in a didactic way, and both groups were tested in a written test at the beginning and end of a term.

Questions requiring inference were considered to be answered at a pre-operational level if no explanation was given; at a concrete level if only one explanatory reference was given, and at a formal level if all explanatory references were given. Responses to questions requiring a pupil to take account of two points of view were categorised as pre-operational if they showed no logic, concrete if they showed increasing quantities of substantiating evidence but only in support of one viewpoint, and formal if they appreciated two viewpoints.

A broad, simple, framework of three Piagetian levels was imposed on responses from a group of boys of the same age, yet the historical material which was used was complex. Again, the research seems to force historical thinking into an uncomfortable mould.

Dickinson and Lee (1978) concentrated instead on defining historical thinking more carefully as the starting point. As in Hallam's and Rees' studies, the subjects were asked to understand motive as the cause of events. But the researchers made clear the distinction, for the first time, between understanding behaviour from a contemporary point of view, and from the standpoint available to the person at the time. Their subjects ranged from twelve to eighteen years old. They asked them why Jellicoe turned back at the battle of Jutland, and gave them, from secondary sources, some of the information available to him when he made the decision (p.82). From the responses, they suggested four levels with intermediate categories, which may be broadly described as

One: Action treated as unintelligible.

Two: Reference to agent's intentions and situation, but this is not seen from his point of view.

Three: Reference to agent's view of the situation, but the situation not fitted into wider context.

Four: Agent's view of situation and the historian's both seen in a wider context.

These categories, although related to motive, are similar to those of Booth (1969). Dickinson and Lee feel that systematic organisation of such levels and kinds of understanding and misunderstanding would go some way to providing criteria for the establishment of categories relevant to historical thinking in a way in which classical Piagetian categories, except in a very general sense, do not. Piaget's levels need to be translated on the basis of historical criteria.

It seems that attempts to apply Piagetian levels to deductive reasoning about historical evidence have found the broad bands of pre-operational, concrete and formal thinking, unhelpful. They can be found amongst a group of children of almost any age, because the nature of evidence, and the complexity of historical questions, varies. It may be more useful to define historical questions and the kinds of evidence appropriate at different levels, then to look in a much more refined way at the ways in which children respond to them.

Shawyer, Booth and Brown (1988) noted that although there has been a greater use of sources in the last ten years, there has been little research into children's levels of understanding of evidence. Shemilt (1980) found that children taught through active problem-solving are less inclined to regard 'facts' as certain and has suggested four levels of understanding: evidence as 'information', as giving answers to be unearthed, as presenting problems to be worked out, and, finally, as recognition that the context of evidence is necessary to establish historicity. However, Shemilt was dealing with 13-16 year olds. There is evidence in Rees' and Hallam's work that younger children can learn to think in an historical way.

Three recent small-scale studies have investigated young children's ability to make deductions about evidence. David Wright (1984) found

that a class of seven-year old children were able to draw their own conclusions about pottery 'finds' from the past, and John Davis (1986) asked Junior School pupils to identify 'mystery objects' and found that they could make historical statements which were tentative and provisional. Keith Hodkinson (1986) showed genuine historical objects (newspapers, candleholders, etc.) and 'fake' historical objects (e.g. a mock ship's log) to seventy-seven children of nine to ten years of age. They were asked "What is it? What was it used for? Is it genuine?" He, too, found that over half of the children used probability words, and many used 'because' to develop their argument. These studies did not attempt a Piagetian analysis or explore the range of children's thinking in any detail, but they suggest that it may be possible to devise teaching strategies which stimulate the building blocks of advanced historical thinking in young children.

Marbeau (1988), writing of history in the Primary School, said that we must build up 'primary schema ' in the child which do not condition in a constraining fashion, but provide a means for open and animated thought so that the child has intellectual autonomy, can take risks and exchange ideas and organise his thoughts relative to the thoughts of others. "We must make his notions concrete so that they can be explored. A plan or a photograph can come to life." Marbeau posited stages in responding to such evidence as: illogical, semi-logical (incompletely expressed); restatement of data; going beyond the information given; and, finally, abstraction.

Piaget, then, has shown that there is a sequence in deductive argument. However, we need to clarify Piaget's stages as applied to history through refining the types of evidence we give children to interpret, and refining the questions asked of it. This thesis investigates the responses of eight-year old children to different types of evidence, and to different questions.

A2. HISTORICAL EMPATHY

(i) Definitions of Historical Empathy

Interpreting historical evidence may involve explaining a sequence of events, or the behaviour of an individual or a group. It may involve explaining how something was made, or used, and what it meant to people at the time. Evidence may be non-conformatory. It is always incomplete, and it is the only reflection of the thoughts and feelings of the people who created it. Historical evidence is, therefore, often open to a variety of equally valid interpretations. In order to interpret evidence, it is necessary to understand that people in the past may have thought, felt and behaved differently from us because they lived in societies with different knowledge-bases, belief systems, views of the world, and different social, political and economic constraints. Traces of the past only become 'evidence' if we know the kinds of questions to ask about them, and the ways in which to answer them. The disposition to make a variety of valid suggestions about incomplete evidence, which take into account that people in the past may have thought and felt differently from us is, therefore, an integral part of deductive reasoning in history. It has been called 'historical imagination', or 'historical empathy', yet these terms have led to a great deal of confusion, because they have often been regarded as discrete from interpreting evidence, and a consensus about their meaning is only gradually emerging.

Historians have an implicit understanding of historical imagination and empathy, which is not adequately articulated. Kitson Clarke (1967) points out that "men's actions can be the subject of detailed research but what went on in their minds can only be known by inference." Elton (1970) sees historical imagination as "a tool for filling in

the gaps when facts are not available." Ryle (1979) sees it as a means of cashing in on the facts, and using them: ammunition-shortage, and heavy rain before a battle, cause the historian to wonder about the hungry riflemen and delayed mule trains. Keith Thomas (1983) says, in the tradition of the Annales School of Bloch and Fevre, that what interests him about the past is the mental structures of the time, what ordinary people thought, felt and believed.

Historians, then, do not question that making deductions about historical evidence involves a variety of probabilistic interpretations, and conjecture about thoughts, feelings and beliefs.

Empathy, when used to describe this aspect of historical understanding, has been criticised for several reasons. Firstly, it has been associated with free-floating imagination, inadequately related to evidence, because of its translation from the German 'einfühlung' (Dilthey 1959), in which it is compared with responses to art, drama, painting and literature. Secondly, it has also been confused with sympathy or identification, or with trying to put one's self in the place of people in the past and share their thoughts and feelings, rather than to attempt to understand and explain what these may have been.

Boddington (1980) lists a number of unclear definitions:

(1) Blyth A (1975) "affective skills are needed to 'feel' into another situation." (p 119).

(2) Cooper K (1976 p 36) "a mixture of thinking and feeling."

(3) DES (1977 p 68) "to enter into the minds and feelings of all the persons involved in an event."

Thirdly, historical empathy is a confusing concept because it has a number of subordinate aspects: understanding different points of view in a conflict; the motives of an individual or a group; the values, attitudes and beliefs of another socity.

Although Peter Knight (1983) said that imagination and empathy are the most important attitudes history claims to develop, he later (1989) concluded that the concept is confusing and unhelpful.

Because the definition of historical empathy is unclear, it has posed problems in devising objectives, teaching strategies, and assessment. Cooper (1976) observed that 'imagine you were....' may not be the best way to test it. Boddington (1980) does not deny the importance of historical empathy, but suggests that a precise definition is required.

Can we then arrive at a definition of historical empathy which recognises its relationship to historical imagination and to evidence, and which clarifies the process of interpreting the thoughts and feelings represented in historical evidence?

It is argued here that historical imagination is the vehicle by which historical empathy is attained, and that historical empathy involves making supposals about the thoughts and feelings which underlie actions, artefacts or any other historical evidence.

Firstly, let us consider historical imagination. Historical imagination is not free-floating or fictitious, but must be related by specific criteria, to evidence. Supposals about evidence must attempt to understand what the evidence may have meant to people at the time: Gildas, for example, is probably

not so much a chronicle of events, as an allegorical exhortation. The Iron Age 'Waterloo Helmet', or the Uffington chalk horse in Berkshire, may be cult or ceremonial objects representing ideas or social practices about which we can only surmise. What was the status of a torc dating from 1,000 B.C. discovered in a Wiltshire field? "This may have been a votive offering to a god, or buried as part of a funeral ceremony, or it might have been stored." (Nick Merriman, Curator, Museum of London. The Times, August 23rd, 1990).

These supposals are only valid if there is no other evidence to refute them, if they fit in with what is known of the period, and if they accept that people in the past behaved rationally. Yet within these criteria, rival interpretations are generally possible, and evidence is often inconclusive. There are no fixed rules which guarantee a correct conclusion. Historical imagination is the disposition to make a range of valid supposals about evidence. "If the pupil does the supposing with real insight and makes perceptive selections from the wealth of possibilities open to him, given the evidence he has, we may say his supposal is done "with imagination." Lee (1984). It is possible, for example, to suppose that the Waterloo Helmet may have been awarded for bravery, that the patterns on it have meanings - success in battle, or symbols or good fortune, or the name of a tribe, a description of the wearer, a prayer. Historical imagination gives rise to a range of such valid supposals and so makes it possible to switch viewpoint and to suggest what the evidence may have meant to people in another society with different beliefs, values, and social practices. It is the bridge, the disposition, which makes empathy possible.

Empathy does not mean either sympathy or identification with people in the past, although these may be staging posts on the way to acquiring empathy. It does not mean that the historian projects his own psyche into the past and reconstructs how people may have acted in a given situation because, given the plethora of possible mental states, no one reconstruction can be accurate. Nor does it mean conjuring up a vision of the past which is acceptable to a contemporary audience. It means understanding a cast of mind rooted in another culture with different views of the world, and ways of thinking through which it is possible to make sense of the evidence, with circumspection and humility.

In order to establish that empathy does encompass a notion of thought and feeling, and that it is an integral part of the process of interpreting evidence, it is essential to clarify the relationship between the evidence (be it a piece of writing, a place-name or field system, a stone circle, a picture or an artefact), the feelings and ideas of the individuals, or society, which created the evidence, and the historian whose task it is to suggest what these might have been.

Collingwood attempted to clarify the relationship between interpreting evidence and interpreting the thoughts and feelings of the people who made it. He says, for example, in his Autobiography (1939 p 7) that we know that Julius Caesar invaded Britain in successive years, we can suppose that his thoughts may have been about trade, or grain supply, or a range of other possibilities, and his underlying <u>feelings</u> may have included ambition, or career advancement. Collingwood (1939) also points out that an historian can share the thoughts of someone in the past because he has experienced similar feelings and thoughts within his own contexts through a shared humanity but that, nevertheless, they are different thoughts because for the person in the past,

the thought was part of a question and answer complex, in a real-life situation. The historian is not in the same situation as Nelson was at the Battle of Trafalgar when he said of his decorations, "In honour I won them. In honour I will die with them." Collingwood (1946) develops his ideas about the relationship between interpreting evidence and understanding the ideas it represents in 'The Idea of History' (p 147) where he says that, "Man does not live in a world of hard facts to which thoughts made no difference, but in a society with a moral, economic and political structure and rule, and as the structure changes, man's thoughts and behaviour change too." History, he says, is the history of thought and men may appear to have thought simply in the past because we have forgotten the questions to which they sought the answers, and the social structures within which they lived.

However, Collingwood may be criticised on three counts. Firstly, history does include facts which are statements about the natural world (for example the Lisbon Earthquake, or the Black Death). Secondly, actions can be enforced, or may be based on thoughts which are dominated by emotion, obsession, or compulsion. Thirdly, history can be concerned with institutions, groups or cultures, which cannot 'think'. Louis Mink (1968) argues that this confusion has arisen because, "The Idea of History"contains only tantalising and not wholly-consistent intimations of the ways in which, for Collingwood, the concept of thought is connected with the concept of action and emotion." Mink says there are two reasons for the inconsistencies. "The Idea of History"is seven essays, published at different times, with the problems and solutions 'left in wax' to be reconstructed. Furthermore, the vocabulary is the language of scientific enquiry, and so is bound to lead to ambiguities in discussing the differences between scientific and philosophical concepts.

In order to clarify Collingwood's theory of the relationship between thought, action and emotion, and refute the criticisms, Mink reconstructs a model of mind based on Collingwood's other philosophical writings, written both before and after 'The Idea of History' was written. Mink constructed a diagram from what Collingwood said about levels of consciousness in The New Leviathan (1942 pp 5, 82; 5.9) and The Principles of Art (1938 pp 218-219, 230-233, 266-267). It shows how, at the lowest level, organic processes give rise to pure feeling which lead, on the one hand, to appetites (hunger, thirst, fear), then to desires (the ability to identify the object of an appetite (water,food, enemy, power), and so to will (the will to satisfy a desire), and therefore action. On the other hand, the basic biochemical drives also lead, via another route, to imagination (which differentiates feelings of fear or hunger), then to perception (an awareness of specific objects for differentiated feelings), and, finally, to intellect, (as rational awareness of thought processes). At the highest level, that of observed behaviour, the historical evidence is created, whether it be an action, an artefact, a building, a picture, or a piece of writing. At this level, the two paths combine. Action expresses the choice produced by rational thinking, which has its roots in feeling and imagination. Feelings and thinking only continue to exist, to the extent to which they are represented in the action, in the evidence.

The model then explains how the historian may make supposals about the thoughts and feelings which underlie actions (or artefacts, or other evidence of the past). Indeed, it shows this to be essential, since what is done may well be unintelligible, apart from the desire on which it was based. Thus, only fourth-level acts can be re-enacted, but <u>as</u> re-enacted, they carry with them the freight of

lower level states, modified by the activity of the higher level. For example, when Caesar entered Rome, a fourth level act of will, the historian does not claim to re-enact what he felt, but he can take account of his second and third levels of experience which are revealed in this fourth level act of will - the ways that ambition mastered caution, which was expressed in the action. Similarly, the historian can make suppositions about the feelings of fear, pride, hope, which Iron Age people may have been aware of and translated into conscious inferential thought and intentional action, in making the Uffington Horse. We cannot say how it felt to make a Stone Age cave painting, or to be a Stone Age person in a stone circle, to work an Iron Age field, or wear the Waterloo Helmet, any more than we can re-enact how Eva Braun felt in the Berlin bunker, but we can apprehend the motives which account for the cave painting, the stone circle, for ploughing the Iron Age field, or dying in the bunker, and these intentional actions are all the product of second level feelings, of awareness of inadequacies and needs associated with conscious feeling, and of third level feelings, of the identification of objects to satisfy these needs and feelings, but transformed at the fourth level.

It could be argued that Collingwood's theory is only concerned with conscious thought, and that many actions are symbolic enactments of unconscious wishes which are rationalised by the agent, who does not understand them.

African Stone Age Bushmen, for instance, induce a trance-like state which gives rise to patterns and images which are recognised as caused in the central nervous system by sensory deprivation, and their cave paintings associate these with control over the animal spirits' world. Hitler's mental state has been attributed to the trauma on the

death of his mother, from which he never recovered. However, Mink claims that you cannot discover what a person is really doing until you first discover what he thinks he is doing, (Even a psychoanalyst tries to make a person conscious of what they are doing). Historical understanding and explanation, then, are inextricably linked.

Mink, too, argues that Collingwood's theory can include the history of groups of people. In 'The Idea of History' (1946 p 189), Collingwood says that what men think of themselves and their world reflects their shared conceptual system. Therefore, the feelings and thoughts of people can be analysed through typical and anonymous individuals. Indeed, it is only possible to study 'The Stone Age' or 'The Iron Age' and even 'The Saxons' in this way.

The job of the historian, then, is not to re-duplicate the lost world of the past, but to ask questions and to answer them. In the question and answer sequence, the 'right' questions are the ones which lead on to the larger complex and do not draw a blank. There is no limit to the number or kinds of questions, or to the relevant evidence.

Making supposals about the feelings and thoughts which underlie evidence is an integral part of hypothetico-deductive reasoning which lies at the heart of the process of understanding the past.

Since there has been a great deal of confusion over the meaning of the terms historical imagination and historial empathy, and over the relationship between them, their definitions in this thesis must be clearly stated. It is set out in Diagram 5. Historical Imagination(A) includes the ability to make a range of valid

suppositions about how things were made and used by people in the past; they are valid if there is no contradictory evidence, if the suggestions conform with what else is known of the period, and if they are supported by argument. The process of making a range of valid suggestions about how things were made and used often involves considering the thoughts, beliefs and feelings of people in the past. Therefore, the process of historical imagination also involves the process whereby historical empathy is achieved (B). Historical empathy is the achievement of understanding the ways in which people in the past may have thought, felt and behaved differently from us, because of their different knowledge base, and because of the different social, political and economic constraints of the society in which they lived (C). Children can make suppositions about how things were made and used, which are valid, judged against their own knowledge and level of maturity, but the validity may therefore be restricted (A-1). Children can therefore participate in the process of considering how the people who used these things may have thought and felt, but, again, the validity of their suppositions is limited by immaturity and lack of knowledge (B-1).

Thus the process of historical imagination often involves the process which leads to the achievement of historical empathy. Children can take part in this process, although they cannot achieve true historical empathy because of their immaturity. Historical imagination is necessary in order to achieve historical empathy.

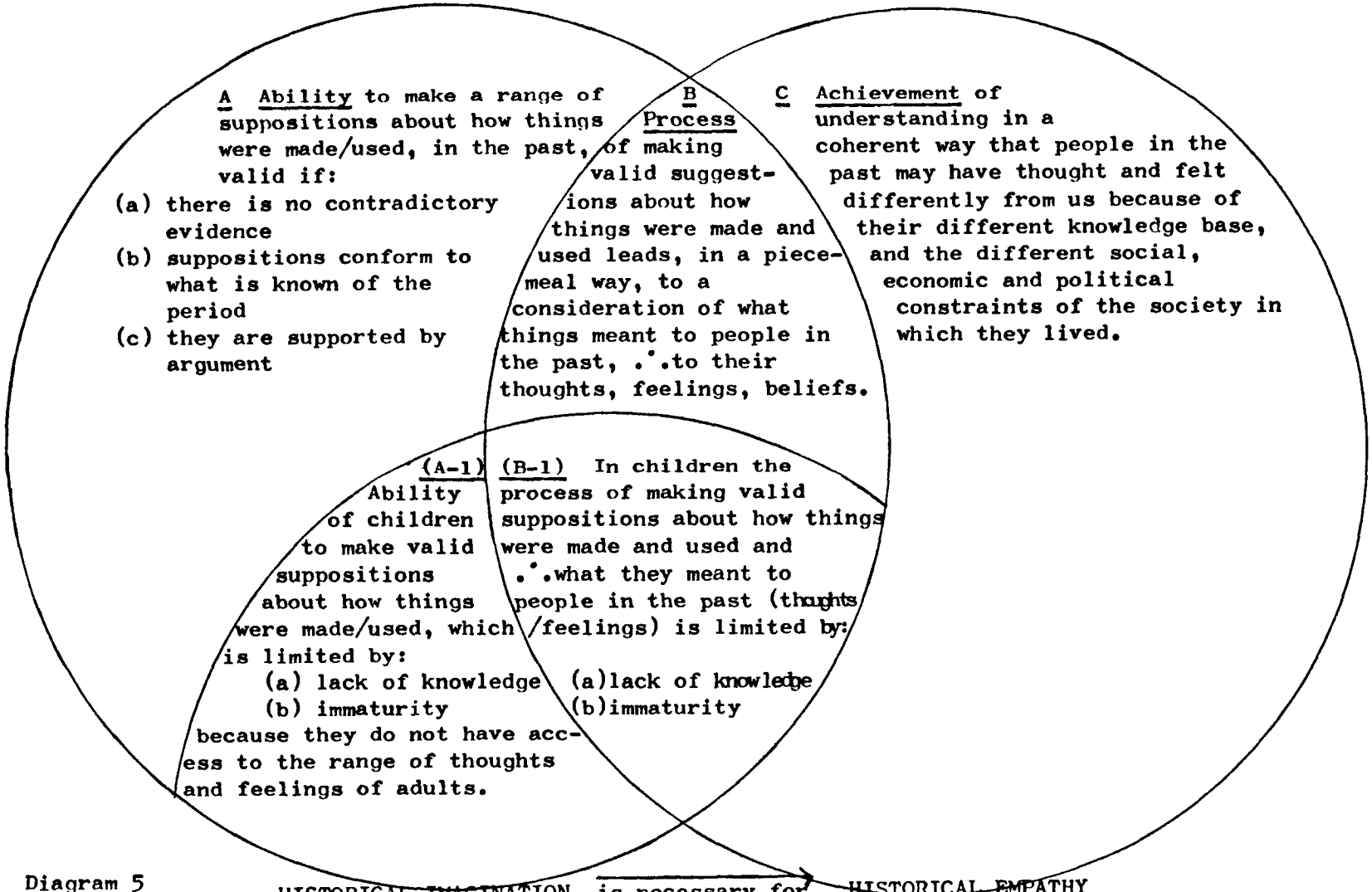

Diagram 5 HISTORICAL IMAGINATION is necessary for HISTORICAL EMPATHY

Diagram showing relationship between historical imagination and historical empathy as defined in this thesis.

A2. HISTORICAL EMPATHY

(ii) Theories of Developmental Psychology Relevant to Historical Empathy

Confusion over what is meant by empathy in psychology is easily shown. Goldstein and Michaels (1985) gave seventeen different definitions, and Peter Knight (1989) refers to many more examples. However, there are three areas of developmental psychology which seem relevant to the development of historical empathy: work on 'creative thinking'; work on changing perspective, and theories of psychodynamics.

The first area, 'creative thinking', may have implications for how children may best be encouraged to make a range of valid supposals about evidence (how it was made and used, and what it meant to people at the time).

Since the 1950's and 1960's, some psychologists have been concerned that traditional I.Q. tests are too narrow a measure of intellectual ability. They attempted to devise tests of 'creativity'. This was difficult to define. Rogers (1959) saw it as a novel product 'growing out of the interaction of the individual and his material....' Guilford (1959) used factor analysis to find traits related to creativity: these included ability to see a problem; fertility of ideas; word-fluency; expressional fluency; ideational fluency (the ability to produce ideas to fulfil certain requirements - such as the uses for a brick - in a limited time); flexible thinkers who could produce a variety of ideas, or solve an unusual problem (which of the following objects could be adapted to make a needle - a radish, fish, shoe, carnation?), and a tolerance of ambiguity - a willingness to accept some uncertainty in conclusions. Tests Guilford devised were to measure such ability. Other tests of creativity followed. Torrance (1965) used an 'Ask and Guess' test requiring hypotheses about causes

and results related to a picture, and a 'Just Suppose' test in which an improbable situation in a drawing requires imaginative solutions.

As a result of such tests, there was much debate as to whether it was possible to perform well on an I.Q. test and not on a creativity test, and vice versa. Getzels and Jackson (1962) and Torrance (1962) found there was correlation at lower levels, but not beyond 120. Guilford (1959) offered a 3D model of intellect based on factor analysis which includes both traditional 'I.Q.' and 'creativity' dimensions. Wallach and Kogan (1965) on the other hand, attempted to distinguish between creativity and intelligence. They argued that Getzels' and Jackson's (1962) creativity tests were each more strongly correlated with traditional I.Q. tests than they were with each other and so measured nothing distinct from general intelligence. Wallach and Kogan say that creativity can be tested by the number of associates, and the number of unique associates generated in response to given tasks - both verbal and visual; and since unique associations come after stereotypes, the 'test' situation must be in a relaxed, non-evaluative, untimed, play environment. Their tests included the interpretation of visual patterns, and suggesting uses for objects, such as a shoe or a cork. They found a correlation of .4 between their creativity tests and .5 between the I.Q. tests, but only a correlation of .1 between the I.Q. and creativity tests. They concluded that creativity is a new dimension which concerns a child's ability to generate unique and plentiful associates in a generally task-appropriate manner, and in a relatively playful context; this is independent of traditional I.Q. The extent to which creativity is related to I.Q. seems to depend then on the nature of the 'creativity test'.

Such research had implications for classroom practice. It is generally accepted that the ability to think 'creatively' rather than to conform

without question, is important for individual and social well-being. It has been shown that teachers can develop 'divergent' thinking, both through creative problem-solving courses (Parnes 1959) and by creating an environment in which children become confident in their ability to think adventurously (Haddon and Lytton 1968). Torrance (1962), Wallach and Kogan (1965), and Getzels and Jackson (1962) on the other hand showed that highly creative children are often not encouraged, or not recognised as able by their teachers, in spite of performing well on school tasks, because teachers often prefer conformity.

A second area of psychologists' work which may shed light on children's ability to understand how people in the past may have thought, felt and behaved, is concerned directly with empathy. However, psychologists' definitions of empathy are of limited use when applied to history because they are partial, or misleading, or irrelevent to history.

Hoffman (1976) sees it as referring to the involuntary experiencing of another person's emotional state, while Kohlberg (1976) argues that it is a cognitive as well as an effective process, akin to role-taking. Clearly, it is not simply projection of one's self into another situation, which is similar to assimilation in Piagetian terms, but is something closer to accommodation.

Piaget sees it predominantly as a cognitive process, thinking rather than feeling, from someone else's point of view. His three mountains experiment (1956) suggests that young children find this difficult, but others have said that this depends on their involvement, their understanding of the situation, and on being required to make the attempt. Flavell (1985) suggests that children are often capable of making inferences which enable them to see someone else's point of view, but do not see the need to; and this is endorsed by

Martin Hughes' 'policeman replication' of the three mountains experiment quoted by Margaret Donaldson (1978), and by the 'Sesame Street' test of Borke (1978). Recent research concerned with the development of points of view (Cox 1986) differentiates between visual perspective-taking, conversational role-taking, and pictorial representation. In each instance, young children appear to be underestimated.

Cox argues that although Piaget and Inhelder say that children under about seven find it difficult to represent an object from a different perspective, especially by drawing it, they are able to see what other people see; but find it difficult to communicate this knowledge. In their verbal interactions, children do develop inferences concerning the points of view of others; this is illustrated in the way they adjust their sentence structure for different age groups. However, Cox concludes that most research on interaction has been concerned with very young children and adults, and that we need more on the intervening years in order to understand how adult behaviour develops.

Piaget's work on 'The Moral Judgement of the Child' (1932) suggests the sequence in which children learn about rules: at first, children do not understand that rules exist, then they change them according to their own needs; they then come to accept one set of rules rigidly, and finally are able to understand that rules change as society changes and are not absolute. In historical terms, they first become able to see life from another standpoint, but only with maturity can they understand why rules and behaviour change with society.

The third area of psychologists' work which has a bearing on how we should develop children's historical imagination, is concerned with psychodynamics. Richard Jones' (1968) approach is based on the work

of Erikson (1965). Jones criticises Bruner's emphasis on deductive reasoning divorced from emotional involvement. Jones thinks that children can and must be encouraged to understand both themselves and the behaviour, feelings and ideas of different societies, and that the humanities provide an ideal means of doing so. He thinks it essential that a process of cognitive development should be related to emotional and imaginative growth. Bruner, Jones says, never understood how the free-flow of creative fantasy and the rational process of proof can be related through the educational process, but Jones believes that if children are to dig up bones, they must be given the opportunity to explore the byways of their own preconscious processes, "It is necessary that children feel myth as well as understand it" (p 49). His work gives examples of how this may be done, by looking for believable points of comparison, which are emotionally charged issues, between familiar and unfamiliar worlds. However, he compares modern Western society with contemporary Netsilik Indians, but does not trace the development of children's understanding of them. He asks children, for example, to list the kinds of conflicts to be expected in a Netsilik winter camp and how they are solved (through food-sharing, games, taboos, and magic), then to categorise their own conflicts, and ways of solving them; he examines the problems of the old grandmother who cannot keep up with the tribe in the harsh winter and is abandoned, and asks the children to consider how we cope with old age; after seeing a seal hunt, and a Netsilik boy learning to stone a seagull, he asks them to list the things they could never do and find hard to understand; and he asks them to write their own 'myth' or dream about a subject which involved their own fantasies.

Theories relating to historical empathy then regard it as both a cognitive and an affective process, although the relationship and pattern of development is not clear. Indeed, Bloom's Taxonomy of Educational Objectives (1965) separated the cognitive and the affective, but the second handbook constantly refers to the overlap. Watts (1972) stressed the constant interaction of deductive reasoning with associative or imaginative thinking in history, through a series of four stages of development, but he did not define these stages or say what the relationship was between them, or produce any evidence. Collingwood gave examples which show how the ability to make suppositions about the thoughts and feelings which are revealed in actions is essential in interpreting the action, the evidence. The work of some psychologists showed that the creativity needed to make valid suppositions and the ability to suggest another person's point of view involves reasoning, but psychodynamic theories showed that such reasoning involves an exploration of creative fantasy, an understanding of one's own feelings, and of how these are part of shared human experiences.

A2. HISTORICAL EMPATHY

(iii) Research Investigating the Development of Historical Empathy in Children

It has been argued that historical empathy involves the ability to make a range of supposals about evidence, and that this leads to an understanding of values and attitudes different from our own. Research in psychology suggests that children may be encouraged to think in a creative way, that they are able to see different points of view, and they can begin to understand attitudes and values of other societies. However, there are dangers in transferring findings in psychology directly to the development of historical empathy. Peter Knight (1989a) found no statistically significant correlation

between the empathy score, using Bryant's (1982) empathy index, and his tests for understanding people in the past. Nevertheless, there have been three studies which suggest that in history children become increasingly able to make supposals, to understand other points of view, and values different from their own.

Sophie Blakeway (1983) constructed tasks which she felt made 'human sense' (Donaldson 1978), were age-appropriate (Borke 1978), and which made children aware of different perspectives and the need to communicate them (Knight 1989c). In the first part of her study, she showed that her class of nine-year-olds could understand the pain and uncertainty of evacuees in the second World War, and could also understand the thoughts and feelings which might have been experienced by an adult - a fighter pilot. However, the attempt to give the material 'human sense' in that it involved children, not long ago, in the same school, meant that the children were more likely to sympathise and identify than to display an understanding of different attitudes and values. In the second part of the study, she investigated the ability of two classes of eight and ten-year-olds to construct practical inferences. She asked them, "What would you have felt if you were the fifteen-year-old King Richard III fighting the rebels in the Peasants' Revolt? Would you agree to their demands?" She found that emotions ascribed to the King were limited to the children's own experience of life. This is not surprising since emotions are characterised by cognitive content; the difference between a person feeling fear, jealousy or anger, depends on their perception of the situation. The older children offered more possible interpretations of the King's reasons. Three-quarters of the children, especially the older ones, were also able to say why they might have gone to London, if they had been peasants. Sophie Blakeway's studies show that by stopping to consider choice, children become more aware of the possibilities that are available,

they have more control over their thinking, and become able to generate a variety of supposals, which lead towards an understanding of another viewpoint.

Peter Knight (1989b) considers the term empathy unhelpful because it involves several different competencies. He prefers to call it 'understanding people in the past'. This, however, is an even looser term. Yet Peter Knight (1989 a, b) traces the emergence in sequence of four different aspects of children's understanding of people in the past. He tape-recorded responses of 95 children between six and fourteen years of age to four different tests. He found that the first competency to emerge was the ability to retell a story (The Peasants' Revolt of 1381) from the point of view of someone involved in it. Six-year-olds found this difficult, but 67% of the sample could do this by 9.3 years, and 80% by 10.3 years old. Next, children became able to explain an apparently strange attitude. When told the story of General Wolfe, and asked why he may have said "Now I die happy", 32% of the six and eight-year-olds offered nonsensical explanations (notably, 'he was no good in the army because he was a wolf' !), and accepted both that he was unaware of the dangers and also deterred by them. The older children (67% by 9.4 years, and 80% by 12.8 years) accepted that people are driven by reasons, and do what seems sensible to them, and also displayed an appreciation of a range of possibilities. The primary school children were not successful in the other two tasks, where they were asked to predict the ending of a story, or to interpret equivocal information, about William I. Knight's research is encouraging; he concludes that Junior School children have sufficient understanding of people in the past to be worth encouraging, and finds, like Blakeway (1983) that they are capable of making a range of valid suppositions. However, his statement that "they need not therefore be restricted to the

'evidence approach'," (1989c pp 218) is confusing. It has already been argued (Diagram 5) that understanding people is an essential part of interpreting evidence. Although Knight and Blakeway seek the simplest form of empathy to emerge in young children, both their studies involve understanding accounts and the motives of individuals in complex situations. It seems likely that attempts to suggest what things may have meant to people in the past begin to emerge much earlier. Quite young children can suggest the implications for peoples' lives of, for example, a candle sconce, or a tomb-stone inscription, if asked simple, open-ended questions.

Attempts to classify levels of historical empathy amongst adolescents have refined our thinking about later patterns of development, but since they have been designed for older pupils, the material has involved an understanding of beliefs and complex social practices. Therefore the findings, at the lower levels, have not been encouraging to Primary School practitioners.

Ashby and Lee (1987) define five levels of empathetic understanding. They made video recordings of small group discussions amongst 11 - 14-year-olds, in which no teacher was present, about Anglo-Saxon oath-help, and ordeals. At the first level, the Anglo-Saxons were seen as simple, and their behaviour as absurd. At the next level, there are stereotyped role descriptions and conventional classification of situations with no attempt to distinguish between what people now know and think, and what they knew and thought in the past. At the level of 'everyday empathy', there is a genuine attempt to reconstruct the salient features of a situation, and personal projection into the situation. With 'restricted historical empathy', it is recognised that beliefs, values and goals were different, though they still may be regarded as unintelligible. At the fifth level of 'contextual

historical empathy', there is clear differentiation between the point of view, institutions, social practices, beliefs and goals of the historical agent and that of the historian, and strategies are employed to understand what a person must have believed, in certain circumstances, in order to have acted in a particular way.

Shemilt (1984) describes five similar levels amongst fifteen-year-olds. At the lowest level, they attributed different practices and beliefs to intellectual and moral inferiority and refused to consider motive; at the next level, they were concerned with motive and surprised and puzzled by the beliefs of their predecessors; at a level of 'everyday' empathy, they would think themselves into a situation and try to reconstruct ideas of the past as analogies of their own experience. At a level of 'historical empathy', they would "think themselves into an alien mind", and at the level of 'empathetic methodology', they were concerned with what empathetic reconstruction means.

However, Shemilt concludes that children should not be underestimated; they must be asked suitable questions requiring them to reconstruct evidence, to make inferences, and to critically discuss their explanations. He says that we must realise that they need to concretise the abstract relations inherent in the past, and that children's answers are not devoid of logic, but that their logic is different from that of an adult. Only when a child can recognise what the evidence can tell him, and what it should tell him, can he know what it cannot reveal, and so what additional evidence is needed, and where it may be found.

It is argued in this thesis that historical empathy depends on the ability to understand how people in the past may have thought, felt and behaved, and why. This is achieved through learning to make a

variety of valid suppositions about evidence. Psychologists have shown how children may learn to make a range of suppositions and that they are able, in a limited way, to switch viewpoint, and to consider values other than their own. Research into young children's thinking in history suggests that in a limited way, they can make suppositions about how people in the past may have thought and felt, and research into adolescents' thinking shows patterns in their ability to do so, which could probably be accelerated. However, no study has examined the embryonic stages in which empathy is viewed, not in relation to individual motive and action, but to such evidence as artefacts, pictures, and archaeological sites.

A3. HISTORICAL CONCEPTS

(i) The nature of historical concepts

Historical evidence can only be interpreted through language. We must know the questions to ask about it, and the ways in which to answer them. In order to do so we need to use concepts which are, in varying degrees, perculiar to history. As Blyth (1990) pointed out, however, lists of historical concepts are drawn up almost arbitrarily. Some are concerned with space and time; some are methodological; similarity and difference, continuity and change. Some are concerned with major organising ideas which run through human society: communication, power, values, beliefs, conflict, consensus, interdependence. Some have been created by historians to encapsulate historical periods, although in some ways these are more like names than concepts: Renaissance, Reformation, Neolithic. Some are 'open' concepts not related to a particular period, and not exclusively historical: trade, law, agriculture. Some are 'closed' or peculiar to a particular time: lynchet, ealdorman.

Before examining work with a specific interest in history, it is useful to consider the more general psychological approaches to the development of concepts.

(ii) Psychologists' research into the development of concepts

Vygotsky (1962) showed the sequence in which concepts develop, and building on the work of Ach and Rimet (1921), he showed that they are learned, not through ready-made definitions, but by abstracting common characteristics, trial and error, and experience. Concept development itself is a deductive process, and, not surprisingly, the stages correspond to Piaget's three stages. At the first stage of heaps, or syncretic images, objects are linked by chance; at the second stage, they are linked by one characteristic which can change as new

information is introduced; gradually, 'pseudo-concepts' develop which are deduced from context and are still unstable (children's and adult's words may seem to coincide, but the child may be thinking of the concept in a different way); at the final stage, a child is able to formulate a rule which establishes a relationship between other concepts and so creates an abstract idea.

Other psychologists since have endorsed this process and levels of concept understanding. Klausmeier (1978, 1979), Ausubel (1963, 1968), and Gagne (1977), show how, at a 'concrete' level, a child is able to discriminate similarities and differences and so classify concrete and increasingly abstract concepts on the basis of visual codes (e.g. spears and arrows are weapons) and that language is used for cueing and labelling; but at a formal level, he is able to formulate a rule which establishes a relationship between classes of abstract concepts (e.g. weapons are necessary for defence and attack).

The work of Klausmeier, Ausubel and Gagne shows that, although there is a sequence in concept development, with directly experienced concepts preceding abstract concepts which are based on them, this sequence is not solely hierarchical or parallel for all concepts.

The boundaries between concepts are often fuzzy and undefined. Wittgenstein (1958) argued that members of categories, for example, games, have common similarities and relationships, but not exactly the same features, and members of the category differ in how typical they are. Research has endorsed this. Rosch and Mervis (1975), for instance, selected twenty instances for each of six categories (e.g. weapons, clothing, furniture) and asked subjects to list attributes of each instance. In none of the six categories was there more than one attribute that was common.

Hierarchical levels are also often unclear. Most objects can be categorised at each of several hierarchical levels. Rosch, Mervis, Gray, Johnson and Boyes-Braem (1976) asked people to list all the attributes of features that applied to the items of each of three levels of a hierarchy (e.g. furniture, chair, easy chair). Few attributes were listed for the superordinate categories (e.g. furniture) but at the lower levels, very similar attributes were listed for the different categories. This research suggests that the intermediate level categories are the most basic categories. They are usually the first acquired by children (because there is insufficient information at a higher level, and not enough examples at a lower level). Mental images at this level can reflect the whole category; objects tend to be recognised more quickly as members of this category. This research also showed that the primacy of basic level concepts reflects fundamental perceptual and cognitive processes.

Psychologists then have investigated the pattern of development in concept acquisition, and the nature of concepts. They have also examined how concepts may best be taught.

Vygotsky first suggested that concept understanding could be promoted by careful use of language. He said that concepts which are specially taught because they belong to a particular discipline and are not acquired spontaneously are learned more consciously and completely; the significant use of a new concept promotes intellectual growth. Shif (1935) designed experiments in social studies which illustrate this theory. He found that, given sentence fragments ending in 'because', more children were able to complete it using a 'scientific' concept, such as 'class-struggle' or 'exploitation' than a spontaneous concept related to family situations. This was more true of the second grade children than in the fourth grade. He concluded

that this was because in social science, the teacher had encouraged them to use 'because' consciously and explained new concepts, supplied information, questioned and corrected and so these concepts had been formed in the process of instruction in collaboration with an adult. However, when the sentence fragment ended in 'although', scientific concepts were not ahead of spontaneous concepts until the fourth grade because the child had not yet mastered 'although' in spontaneous thinking, and so could not use it deliberately.

Klausmeier (1979) discusses research into the role played by language in concept acquisition, and into how operations between concrete or classificatory levels occur. At the classificatory level, the operation is discriminating and naming the concept. Two interconnecting symbolic systems seem to be used, verbal labelling, and imagery; the word, and images of examples are stored, from which shared characteristics can be abstracted, new information can be added and generalisations made. (For example, various examples of cave paintings or stone circles may be remembered; or of axes, scrapers and flakes; or of Iron Age hut plans.) Rower (in Klausmeier 1973) also shows that language at a concrete level is elaborative in connecting and differentiating things. It seems that language becomes more important than visual and tactile perceptions in forming classificatory concepts as children become older.

G. K. Nelson (1970) (in Klausmeier 1979) found children used both visual and verbal symbols to form concepts, but the older children found verbal instruction more useful. Osler and Madden (1973) (in Klausmeier 1979) found perceptual and verbal cueing equally useful at a classificatory level. Carly and Goss (in Klausmeier 1979) found giving concepts names helped in putting them in proper categories but that the usefulness of

verbal cues depended on the children's level of ability to classify. Landau and Hagen (1974) (in Klausmeier 1979) showed that therefore children at an intermediate level benefitted most. There is agreement then that giving concepts names and verbal cues helps develop concepts at a classificatory level.

In learning abstract concepts which cannot be stored as images, language is essential in formulating an hypothesis, then inferring the concept. This involves classifying the attributes of members of the concept then testing this by logical inference. It requires a person to ask questions in sequence. For example, what is an axe, a scraper, a flake, or an awl each used for? Why? How? Then is their common purpose to facilitate a task by limiting the energy required? What is a bow, a harpoon, a spear used for? Why? How? Is their shared purpose to kill or injure? Then the former group are 'tools' and the latter group 'weapons'. To which group, then, does this implement belong? Johnson and O'Reilley (1964) (in Klausmeier 1979) in their 'gunkle' and 'bunkle' birds experiment with eleven and twelve year olds, found that even limited experience in formulating verbal definitions improved their performance in a defining test. Superordinate concepts are acquired by being able to define several such abstract concepts, and also the rule which relates them. Control or power, for example, in the context of the Stone Age means understanding things which gave people power - such concepts as tools and weapons, and also things that would have power over them - climate, chance, 'Gods', and things they might quarrel about - food, shelter, partners.

Research on concept development has shown that exposure to a range of stimulus objects leads a person to form a prototype which is then used to represent the category in their thinking. However, Posner and Keele (1968) show that people store information about specific instances in

addition to prototype information. Research has also shown that categories are learned more rapidly and accurately when people are initially exposed to only typical examples. However, the prototype theory is inadequate in that a prototype may include irrelevant details (the colour of a particular bird for example), and prototypes cannot always be found for the broader and more abstract categories.

Hampton (1981) found that 'rule' or 'beliefs' do not have the same kind of prototype as concrete categories; they appear to be endlessly flexible so that a complete set of rules or beliefs cannot be specified. Osherson and Smith (1981) say that the prototype theory is concerned with the relatively superficial identifiable aspects of a concept, but not with its core. Freedman and Loftus (1971) investigated the idea that information is organised around concepts, rather than around attributes of concepts. They asked subjects, for example, to name a fruit beginning with P, or gave them P to be followed by the name of a fruit. They found retrieval was quicker when they began with the concept and concluded that concepts play an important role in organising semantic memory.

Research has shown then that concepts are best learned if they are selected and specially taught through illustration using visual or tactile examples (which may be held in mind for prototypes at a concrete level), and through discussion, which makes it possible to discriminate similarities and differences, abstract salient points, and combine them to make further generalisations. Psychologists have, therefore, also considered both the kinds of materials which children should be given to discuss, and how such discussions may be promoted.

Bruner (1966) postulates three 'modes of representation' in understanding a body of knowledge: 'enactive' - depending on

physical experience or sensation (a visit to a site, maybe); 'iconic' - when the essence of the experience is represented in pictures in the mind's eye - paintings, maps, diagrams, models; and 'symbolic', when concepts are organised in symbols as in language. He sees these three kinds of understanding as complementary rather than rigidly successive.

Bruner (1963) says that the questions children are asked about the material, if they are to acquire a deeper understanding of historical principles, must be not too trivial, not too hard, and must lead somewhere, but that we need to know more about the ways in which this can be done. He says that this needs particularly sensitive judgement in history, which is characterised by uncertainty, ambiguity, and probability. They must be asked about carefully selected evidence, so that general principles can be transferred from specific instances, connections can be made, and detail can be placed into a structural pattern which is not forgotten, in order to give them the confidence to discover regularities in previously unrecognised relations. A young child, he says, must be given the minimum information, but emphasis on how she/he can go beyond it. Having selected the experience, the material and the questions carefully, the child must also be taught how to answer it. Max Wertheimer, in Productive Thinking (1961) draws a sharp line between 'rote drill' and understanding, but Bruner says that learning a particular way of formulating and answering questions may not necessarily be 'rote', and may be a necessary step towards understanding conceptual ideas.

Little has been done to put these precepts into practice. Recent reports (DES 1978, DES 1982, DES 1989) show that there is still little attempt to teach children to present a coherent argument, explore alternative possibilities, and draw conclusions.

> "More children might be expected to develop an argument or to explore an idea....than is now the case." (DES 1978).

Since the development of the small portable tape-recorder, there has been considerable research investigating the nature of interactive discussion, and evidence that a tape-recorder encourages on-task behaviour and clear expression of ideas (Barnes and Todd (1977), Richmond (1982), Schools Council (1979)).

Rosen and Rosen (p. 32 1973) and Wade (1981) discuss the nature of group conversations with or without a teacher; Colin Biott (1984) studied children in small, unled discussion groups and found that discussions which were not led by a teacher with a known focus in mind, were in fact more dense, discursive and reflective. Ruddock (1979) explores the teacher's role in discussion, and develops criteria for judging quality. Prisk (1989), however, found that when the teacher was present in an informal group, children did not use their organisational skills; the teacher was responsible for 80% of the structuring moves. She found an open, unled discussion encouraged children to produce tentative suggestions and explore ideas, to entertain alternative hypotheses and evaluate each other's contribution. Kathy Sylva (1980) found that children solved physical problems best when discussion was combined with practical experience.

Although Piaget had concentrated on the interaction of individual children and their physical environment, he had argued (1932, 1950) that conflicting viewpoints lead to decentration. Vygotsky (1962) saw the growth of understanding as a collective process.

Russell (1981, 1982 (a) and (b)) showed how in a group, children are able to clarify the nature of questions they already subjectively understand. Language is thus a flexible and dynamic means of discourse rather than a collection of static symbols. Adult-child interaction then can also be important in promoting cognitive growth, if it is not used to transmit didactic information, but in order to introduce the child to shared cultural values, and to help him towards an understanding of the question, and how to answer it. Wood and Middleton (p. 181, 1975) show that effective instruction is a "dynamic interaction process, somewhat akin to problem-solving."

In current research concerned with the interaction between the social processes and individual cognitive growth, a genuinely post-Piagetian development in psychology is emerging. It results from a dissatisfaction with both the behaviourist theories of social learning, and the Piagetian structuralist approach. However, this has generated a number of conflicting theories which remain unsolved (Butterworth and Light 1982). Some explorations of social cognition have generated a false polarity between the social world and the physical world of Piaget, who was concerned with logic and mathematics. Some emphasise a dichotomy between individual and social approaches to knowing. Neither of these polarities is entirely justified by the work of Piaget or of Vygotsky, both of whom acknowledge the need for discussion and interaction.

On the other hand, it can be argued that cognition is intrinsically social. Hamlyn (1982) argues that social relations are necessary, though not sufficient, for knowledge, "To understand something is to know that it is true, which presupposes knowing what is meant by true." This involves an appreciation of standards of correctness, and thus implies correction by others, and so the context of personal relations. Knowledge is always a matter of degree, in the sense that two people

may know 'P', but one may know more of what is relevant than the other.

This argument lies at the heart of research in social cognition which investigates the possibility that cognitive growth comes about through social interaction. Doise (1975, 1978, 1979) sees it as the result of either a conflict of viewpoint or of the interaction at different cognitive levels. Doise and Mugny (1979) show that collective conflict is more effective than individual conflict, although their experiments are concerned with spatial perspective tasks, and they do not demonstrate that conflict of viewpoint is a necessary condition for changes in cognitive structures. So far, no sensitive measures have been achieved for assessing the effect of social interaction on cognition. Paul Light (1983) concludes that "we shall see rapid development in our understanding of these issues in the next few years" (p. 85).

Nevertheless, practical developments in schools have moved relatively slowly. ORACLE (1981) found that "co-operative group work of any kind was an extremely rare occurrence" (p. 176), and the DES Survey of Middle Schools (1983) found that not many opportunities were provided for extended discussion or collaborative work in groups. Galton (ORACLE 1981) suggested that "at the moment, too little is known about how such groups might function....urgent research is required....to observe and identify the best existing practices...." (p.180); and Biott concluded that

> "activities should be designed and evaluated to provide scope for the learning of concepts, or particular procedures of enquiry."

Oliver (1985) concludes that if we are to evaluate the significance of evidence, there must be argument in order to reach conclusions, and that this must involve abstract concepts, although they will inevitably

be rudimentary and incomplete. He says that we need examples of good practice, in which concepts are learned as part of a unit of study. Stones (1979) stresses the importance of teaching concepts, and the stages involved, presenting exemplars and verbal feedback, and encouraging the pupil to use the concept in different situations.

Ashby and Lee (1987) transcribed the conversations of groups of adolescents discussing the significance of oath-helping in a medieval community. They concluded that children often reach higher levels of understanding when arguing out a problem among themselves than they could achieve on their own, providing they have some strategy for tackling it, and that this is true of class discussion as well as of small group work. Their work, however, was with older pupils, did not focus on taught concepts, and employed only a small sample.

A3. HISTORICAL CONCEPTS

(iii) Research applying theories of concept development to children's use of historical concepts

There have been studies investigating children's understanding of second order concepts of time (West 1981), duration (Smith and Tomlinson 1977), and change (Crowther 1982). However, research most relevant to this thesis investigates first order concepts not related to a particular period (Coltham 1960, Wood 1964, da Silva 1969, Furth 1980), more specific historical concepts (Booth 1979), and procedural concepts (Blyth 1984).

Coltham's six concepts were king, early man, invasion, ruler, trade and subject. She asked 236 children between nine and thirteen years of age, first to draw what each concept conveyed to them; to choose from six pictures of each concept representing different levels of understanding; to define it verbally, and to choose appropriate dolls,

clothes and so on to represent the concept. She found a pre-operational response characterised by visual dependence which was affective rather than cognitive; and concrete response showing an ability to co-ordinate different points of view integrated with personal experience; at the highest level, there was an awareness that concepts change with time.

Wood (1964) found that at concrete levels, wages and rent evoked a personalised response which gradually became more abstract, until eventually all the relationships within the concept were understood as reciprocal and changeable.

Da Silva (1969) used the Werner and Kaplan technique (1950) with historical terms, by recording 'slum' as a nonsense word, then asking what it meant. He, too, found three levels of response: no logical response; a logically restricted response changing the meaning due to context; and a level of deductive conceptualisation when each piece of evidence was weighed against the others.

Martin Booth (1979) asked fourteen to sixteen year olds to group pictures and quotations related to 'Imperialism' and 'Nationalism' on cards. He classified their responses as concrete if the groups were based on physical facts in the evidence, such as colour of skin, and abstract if they were based on inferred relationships. He saw the responses as influenced more by good teaching, interest and parental support than by standardised I.Q. scores.

These studies trace patterns of development in historical concepts, but are restricted by their attempt to fit them into a rigid three-tier framework.

Furth (1980) also postulates landmarks in the development of children's understanding of the social world analagous to those of Piaget in physical thinking. His study examines concepts investigated in this thesis. He interviewed 195 children between the ages of five and eleven, and asked them questions about social roles and money, government and communities. Their answers indicate children's growing understanding of these concepts from seeing society as personalistic, to a grasp of a concrete systematic framework, at eleven. Furth shows, for instance, that at five, the primary cause for taking on a role is seen as a personal wish, but between five and seven, they stress the notion of order, and by seven, children focus on the idea of succession and the expertise inherent in a role ("I suppose if someone leaves, someone comes." "Nearly every job you do, there has to be a man in charge.").

Similarly, with government, which 78 of the children mentioned, they had an image of a special man, then of a ruler, then of a job giver or owner of land, till at nine or ten they understood that a government provides functions and services in return for taxes. The younger children emphasised personal needs when explaining 'community'; by 9.3 they stressed the importance of food and drink, and gradually they express needs in a psychologically more elaborate way and refer to institutions and buildings.

This study suggests that it may be possible to select and teach such abstract concepts in an historical context to young children.

Hilary Cooper (1982) investigated the relationship between deductions from evidence, and concept formation. She told children between seven and thirteen the story of Thomas a Becket. Firstly, they were asked

to fill in a chart evaluating the part played in the murder by each of the five individuals or groups involved, then to form a counter-hypothesis in the defence of each of them. The findings showed illogical responses from the youngest and least able; an increase with age in the number of statements supported by evidence, and in the number of causal connections used correctly. Not until about 9+ did the children begin to test their hypotheses and only the bright children of 13+ used causal connections other than 'because', tested each hypothesis, and formed a synthesized conclusion. She also found an increase with age in children's correct use of uncertainty - words such as 'perhaps', 'maybe', 'probably', 'possibly'; but only at 11+ did they begin using these words to speculate about people's motives. At about nine, then, the children were increasingly able to form arguments based on logical premises, and were aware of uncertainty but were not yet able to test their arguments, or take motive into account.

Her second test investigated the extent to which they were able to understand the changing concepts of 'church' and 'state' which lay at the heart of the quarrel. Each child was asked to place eight concrete and eight abstract concepts related either to 'church' or 'state' in overlapping circles, labelled 'church'and 'state' respectively. There were also four 'superordinate' concepts relating to both (e.g. power, subject) which should have been placed in the intersection. The findings showed a marked increase in concept understanding between seven and eleven, that it is learned gradually, and that historical concepts were not acquired through everyday experience. Yet none of the 11+ children understood the superordinate concepts which related equally to 'church' and 'state' and so understood the causes of the quarrel, the overlapping influence of church and state.

Joan Blyth (1984) observed the teaching of three classes of children between five and nine years, and tested their understanding of three concepts: evidence, sequence and power. She concluded that evidence was the simplest concept, and that teaching involving discussion was helpful, although her study was not specific as to how evidence should be discussed or what strategies should be used.

Psychologists have shown, then, how concepts develop through a process of induction, by storing an image of abstracted characteristics, and of deduction, by drawing from the stored image, adding to it and modifying it. They suggest that concept development is promoted by discussion, and that there is a need for concepts to be taught. They have indicated a pattern in the development of concepts.

This thesis investigates children's ability to use historical concepts of different levels of abstraction, which have been selected and taught.

B. CURRICULUM STATEMENTS ON THE TEACHING OF HISTORY TO CHILDREN

Until the 1960's, it was widely presumed that Primary School history must be presented as hard facts, not related to source material, described, not explained or analysed, and based on concrete or sensory experience (Thompson 1962).

Understanding different values and beliefs was ignored, after history lost the strong moralistic and naturalistic bias which was its justification in handbooks for elementary school teachers until about 1930. The approaches were chronological, patch, or line of development (Blyth, J.E. 1989). None of these approaches satisfies a definition of history as a discipline or relates to cognitive development. However, in the past twenty years, there has been an emphasis on children's active involvement in learning. Nevertheless, the 1978 DES Survey criticised Primary School history teaching for having no clear framework, and being based on T.V. programmes and poor text books. Since then there has been much advice about how history should be taught which has not been rooted in research.

Therefore, the Schools Council Projects (1976-8, 1975-80) and DES documents (1978, 1986), do not claim to do any more than offer some guidelines and contribute to the debate. Indeed, the Schools Council Project (1975-80) concludes that history does not have a conceptual framework and that the curriculum development must therefore depend on teachers' subjective assessments and planning. History in the Primary and Secondary Years (DES 1986) talks commendably about the importance of history:

> "Thinking historically is a question of the continued existence of an open society....it teaches self-knowledge, what man has done and might become. It is therefore part of the development of moral awareness."

It speaks of the need to define the nature of history, of its contribution to the whole school curriculum, the need to establish continuity from five to sixteen, and of the importance of defining objectives and methods of assessment which are not dependent merely on increased information; it notes that doing so can profoundly affect teaching methods. Nevertheless, the schemes of work it gives as examples are still predominantly content-based. The Historical Association Booklets (TH52 1983, TH57 1985) offering advice on drawing up a Primary School history curriculum similarly outline the issues involved then give examples of content, but they cannot offer any clues about how children's thinking develops.

This is equally true of L.E.A. guidelines. The I.L.E.A. booklet, (1978), History in the Primary School, says schemes may be based on content, part of environmental and social studies, or have an emphasis on concepts: causation, change, continuity and tradition. The Teaching and Learning of History and Geography (DES 1989) found standards of work achieved in history in the Primary School very disappointing, showing a lack of attention to understanding, skills and attitudes progression, and monitoring individual progress. This is not surprising since although they identified discussion and questioning at appropriate levels and investigative work as characteristics of effective learning, there has been little research into the kinds of questions to ask, the kinds of answers to expect, or the types of evidence children are able to discuss.

Evidence is usually assumed to mean written evidence, in spite of the acknowledged difficulties of archaic script and language. The logical progression of skills in using evidence is seldom explored. Palmer and Batho (1981) say that a child must be taught to summarise a document,

understand the terms used in it, translate it into, for example, statistical form, and select facts relevant to a particular purpose. Cowie (1985) advocates "the use of sources" to provide the slow learner with "an opportunity for logical thought." Entwistle (1970) says history is a matter of "familiarity with sources." The Schools Council Projects attempt to define the sequence of subskills needed to "interpret evidence." In 'Time, Place and Society 8-13', this is seen as learning to distinguish between fact and opinion, to see how evidence is biased and why, and whether it is relevant, and to comment on its limitations. Then the child must be able to compare or contrast two or more pieces of conflicting evidence, and to see how the differences arose. This ignores the earliest and simplest ways to use evidence. The DES document (1986) is more helpful in that it suggests that young children should be shown objects and pictures and encouraged to ask: "What is it? What was it for? Who made it? Why? What difference did it make? What does it tell us about life in the past?" It goes on to say that from eight to sixteen, a more sophisticated stage of historical understanding is achieved as children learn not to generalise from false premises based on inadequate evidence, and that judgements are always provisional and tentative. It gives no idea though as to how this progress is achieved.

There is also a general assumption that learning history involves 'empathy'. The Schools Council Project (1975-80) defines this as understanding the similarities and differences between our own values and beliefs and those in the past, in order to infer the feelings and actions of people at that time, often on the basis of scanty evidence. There are various suggestions as to how this may be encouraged. It suggests that young children may be told a story, then asked what they could see, think, feel and imagine; this implies projecting themselves

into the story and filling in the gaps from a knowledge of the period, and their own experiences. Joan Blyth (1982) suggests almost the reverse approach - appreciating how the past was different - by showing young children a picture of a seventeenth-century dining table and asking them to compare it with their own. A third approach, making inferences from limited information available at the time, is the Schools Council (1975-80) suggestion for older children. They suggest the children could be shown an enclosure or railway bill, and, rejecting hindsight, make decisions on the basis of the evidence that would have been available at the time; this means making inferences from a restricted viewpoint.

There is, too, an acceptance that developing children's historical empathy involves learning that rules and attitudes were different in the past, and why. 'Time, Place and Society' sees values and motives, and questions concerning the quality of life, as central to the concern of history. There are suggestions about how this may be taught.

Kieran Egan (in Blyth 1982) says that between four and nine years of age, children go through a mystic stage of learning, aware of stark opposites of courage and cowardice, security and fear, life and death. He thinks, therefore, that they should be fed on classical stories, myth and legend. Shirley Makin (in Blyth 1982 p 69) suggests that Junior School children can be involved in the moral dilemmas of other times: after they have been told the story of the attempted assassination of Edward I, they should discuss such questions as "was Edward right to say that it wasn't knightly to strike a dead man? Should people trust each other if they are not members of the same religion? Or, did Eleanor do right to accompany her husband?"

Philip Phenix (1964) suggests three ways of learning how values and beliefs change: through learning about humanitarian reforms, learning about moral philosophers, and learning about laws, customs, and moral conditions (e.g. the Bill of Rights) which describe ideal conditions.

The Schools Council (1975-80) suggests a framework for formulating questions about values in relation to events, actions, ojbects and social groups: was it right? was it worth it? was it wise? The DES document (1986) says that between five and eight years of age, children should acquire some moral understanding, by differentiating between heroes and villains in stories and myths, through stories which begin to illustrate the dilemmas and constraints formed through limitations of knowledge, wealth, and geographical environment. However, it says nothing of how this process continues until by 16 a child should be able to "make empathetic judgements". There is, then, a consensus that young children should be confronted with active historical problem-solving, and that this involves making deductions from evidence, using selected vocabulary, and so to the development of historical empathy, but there is little advice about how this may be done.

Jerome Bruner (1963) set out the principles whereby a discipline should be structured so that the thinking process and concepts which lie at the heart of it can be tackled from the very beginning in their simplest form, then in an increasingly complex way. This is what we still need to work out, in history. Bruner said that it is necessary to define the structure of the discipline (the key concepts, questions and methods of answering them). To do this, the subject must be rewritten and teaching materials revamped in such a way that the pervading, powerful ideas and attitudes relating to it are given a central role. In 1966, he said that this involved translating a

subject into appropriate forms of representation which place emphasis on doing, on appropriate imagery or graphics, and on a set of logical propositions governed by rules for forming propositions. Secondly, the sequence of complexity in which the children tackle these key questions and concepts must be defined. In 1966, Bruner defined the sequences leading the learner through a series of statements and restatements that increase his or her ability to grasp, transform and transfer what he/she has learned. He said the optimum sequence is probably enactive, iconic, symbolic, though these vary and cannot be specified. Problems, he said, must involve the right degree of uncertainty in order to be interesting, and learning should be organised in units, or learning episodes, each building on the foundation of the previous one. Thirdly, we need to define the skills children need to learn in order to learn effectively, and so move to extrapolate from particular examples, from a memorable specific instance, to the general, in order to transfer the skills learned to other similar problems; this gives confidence and prevents 'mental overload'.

Bruner (1963) insisted that these principles need to be applied to learning from the very beginning. In Chapter 4, he said, "the more elementary a course and the younger its students, the more serious must be its pedagogical aim of forming the intellectual powers of those whom it serves."

He did not attempt to apply his theory of a spiral curriculum to history, although his MACOS project was concerned with many of the issues of history: the significance of tools to our way of life; the way the essence of communication and humanity lies in symbols; social organisation and the fact that you cannot change a part of the structure of society without changing all the parts. Bruner believed that studying early societies is the best way to understand the nature of

society - the human condition and the continuity of evolution. He said (p.10 1963) that much more work of a specific kind is needed to provide detailed knowledge about structuring the teaching of humanities, and that this has been postponed on the mistaken grounds that it is too difficult. For, he said (p.22 1966),

> "We teach a subject not to produce little living libraries, but to consider matters as an historian does, to take part in the process of knowledge...."

> "If one respects the ways of thought of the growing child; if one is courteous enough to translate material into its logical forms, and challenging enough to tempt him to advance, then it is possible to introduce him, at an early age, to ideas and styles that in later life will make an educated man." (Bruner p.52 1966)

Bruner also made it clear that we have not yet defined in detail and in practice how this is to be achieved.

> "What is abundantly clear is that much remains to be done....carrying out the kind of research that can give support and guidance....in improving teaching..
>
> How may the kind of curriculum we have been discussing be brought within the intellectual grasp of children of different ages?" (Bruner p.32 1963)

The National Curriculum for History (1990) may be seen as an attempt to structure the thinking processes and concepts which lie at the heart of the discipline in an increasingly complex way, as Bruner advocated. It was planned against a background of lively debate about criteria for content, the understanding of time, and the relationship between knowledge and the processes of learning. However, the relationship between interpreting historical evidence, and understanding the feelings, thoughts and behaviour of the people who created it, has

not been clarified, and the posited patterns in the development of understanding are not based on empirical study.

In teaching history, then, there is still no conceptual framework, and no clear pattern of development. Curriculum documents have therefore been left to teachers. However, more refined and structured observation, planning, recording and assessment by teachers is essential if children's historical understanding is to be properly promoted. This thesis suggests that practising class-teachers are able to undertake the kind of research which is necessary, and would benefit from adequate support in doing so.

C. CONCLUSION TO CHAPTER ONE

Understanding in history requires deductive argument about evidence, involving specialised concepts. Deductions are often probabalistic and may involve a variety of possible interpretations made valid by publicly accepted criteria. The process of making a range of valid and perceptive supposals leads gradually to the disposition to understand the possible thoughts, beliefs and feelings of people who lived in other societies.

Psychologists have shown patterns in the development of deductive argument, of imagination and empathy, and of concepts. Bruner has indicated a structure for relating this to a discipline.

However, since previous research involved evidence of differing levels of complexity (usually written), and different age groups, no structure based on cognitive psychology has been devised for history. The level of children's historical thinking has not been found to be consistent with I.Q. or age (Coltham 1960, Hallam 1970, Rees 1976, Booth 1978). The nature and patterns of development of children's thinking in history in the early stages have not been adequately examined.

This study investigates the kinds of evidence which enable young children to make a range of valid deductions about the past, and the kinds of questions to ask about the evidence. It investigates whether group discussions facilitate a wider variety of interpretation, or more sequential arguments than individual responses, and the role of the teacher in such discussions. It analyses the effect of learned concepts on children's interpretations of evidence. It also considers the relationship between interpreting evidence and the development of historical empathy as defined in this thesis (p 43).

CHAPTER TWO METHODOLOGY

A. THE HYPOTHESIS INVESTIGATED IN THE EXPERIMENTAL DESIGN

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- (b) Types of evidence
- (c) Types of question
- (d) Written and oral responses

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- (a) Interpreting selected evidence
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CHAPTER TWO

METHODOLOGY

A. THE HYPOTHESIS INVESTIGATED IN THE EXPERIMENTAL DESIGN

This thesis investigates the hypothesis that young children can become actively involved in historical problem-solving; that there is a pattern in the early stages of their thinking which can be shown, and that their thinking can be evaluated; that teaching strategies are significant in developing young children's historical thinking, and that consistent teaching strategies can accelerate this development.

A1. YOUNG CHILDREN CAN BECOME ACTIVELY INVOLVED IN HISTORICAL PROBLEM-SOLVING

A1 (i) They can make deductions about historical evidence

(a) Argument

Young children can be taught to develop arguments about evidence. Piaget (1932, 1956) and Vygotsky (1962) show that between seven and nine children are increasingly able to form logical deductions in which factual claims are supported by reference to the evidence, using therefore, or because.

(b) Types of evidence

Children between seven and nine can make deductions about evidence of varying degrees of abstraction: artefacts, pictures, diagrams, maps, writing.

Bruner (1966) suggests the sequence of children's understanding of 'mode of representation' is enactive, iconic, and, finally, symbolic, but is aware that these modes overlap. Since historical evidence is interpreted through language, which Bruner (1963) sees as the vehicle for promoting development across the levels, it seems likely that if evidence is presented in a meaningful sequence, children may be able to make deductions about diagrams, maps and writing, as well as about artefacts and pictures.

Piaget (1960) found that children between seven and nine were able to interrelate and reverse portions of a map, when it was rotated (whereas until then they could only describe their own reactions and landmarks, and could not relate the parts to the whole). He found, too, that once children have a concept of length as repeating units, they have a concept of distance.

(c) Types of question

Young children can make a distinction between what they know for certain, what they can suppose, and what they do not know about evidence. Piaget (1930) and Davis (1986) show that between seven and nine, children begin to think in a way which is probabilistic and takes account of uncertainty.

(d) Written and oral responses

Children are able to make more valid supposals about evidence and to develop more arguments in a group discussion than they can in individual written answers, (Vygotsky (1962), Ruddock (1979), Doise and Mugny (1979), Russell (1981, 1982), Hamlyn (1982)).

A tape-recorded discussion encourages on task behaviour and clear expression of ideas (Schools Council (1979), Barnes (1971), Todd (1979), Richmond (1982)).

If no adult is present, their discussions may be more dense, discursive and reflective (Biott 1984, Prisk 1987).

A1 (ii) Interpreting evidence involves developing historical empathy in an embryonic form

(a) Interpreting selected evidence

Children are able to make a range of valid suggestions about how things may have been made or used and so about what they may have meant to the people who made and used them. In this way, they begin to consider the possible thoughts and feelings of people in the past.

Psychologists have shown that children can be taught to produce a range of suggestions about the meaning of a picture, for example, or uses for an object (Guilford (1959), Torrance (1965), Wallach and Kogan (1965)). This is similar to the ways in which Collingwood (1939, 1946) said an historian makes deductions about evidence in order to understand the past. However, children can only begin this process, in an embryonic way, because of theirimmaturity and their limited knowledge.

(b) Reconstructing a picture of the past

Young children can construct a picture of the past by fitting together knowledge they have of concrete evidence, and maybe projecting themselves into a world of which this was part (imagining themselves using a Stone Age harpoon, or scraping a skin; living in an Iron Age hut or a Roman villa; attending a Saxon church). They may ask questions of the evidence to fill in the details of how they would use it: how far can I throw the harpoon? What will I catch? How will I kill it? Who else lives in the hut? What do we eat? How long can I stay in the Roman bath? How hot is it?

Lee (1984) speculates that it may be that sympathy and projecting oneself and one's own experiences and attitudes into a situation in the past is a necessary stage in coming to wonder why people behaved and thought differently. There is evidence that children enjoy telling stories in the first person and projecting themselves into imaginative situations (Wade 1981). However, it is impossible that young children could achieve an holistic view of society, which depends on conceptual knowledge. It seems likely that in recreating a picture of the past, they will respond in a similar way to the lower categories described by Ashby and Lee (1987) and Shemilt (1984).

A1. (iii) They can use historical concepts

(a) Special concepts

Children can be taught to use specialised historical concepts. Shif (1935) and Vygotsky (1962) show that children can be taught selected concepts.

(b) Abstract concepts

Children can be taught to use increasingly abstract concepts. Psychologists have shown how children can be systematically taught to use a hierarchy of increasingly abstract concepts. (Klausmeier (1978), Ausubel (1968), Gagne (1977), Stones (1979)).

A2. A PATTERN IN THE EARLY STAGES OF THE DEVELOPMENT OF YOUNG CHILDREN'S THINKING IN HISTORY CAN BE SHOWN AND THEIR THINKING CAN BE EVALUATED

A2 (i) Deductive reasoning

A pattern in deductive argument has been suggested both by psychologists (Piaget 1926, 1928, Peel 1964, Donaldson 1978) and by researchers in history (Lodwick 1958, Thompson 1962, Booth 1969, Hallam 1975, Rees 1976, Cooper 1982).

A2 (ii) Historical empathy

In historical empathy, Ashby and Lee (1987) and Shemilt (1984) have outlined a pattern of development which, as with deductive reasoning, may be applicable at a lower level then they suggest.

A2 (iii) Concept development

Vygotsky (1962) illustrated how abstract concepts are formed by the formulation of a rule which establishes a relationship between other concepts and so creates an abstract idea. Klausmeier (1978), Ausubel (1968) and Gagne (1977) showed that there is a sequence in development, although this is not solely hierarchical. Furth (1980) outlines children's developing understanding of social roles, government and communities.

A3. TEACHING STRATEGIES ARE SIGNIFICANT IN DEVELOPING YOUNG CHILDREN'S HISTORICAL THINKING

Teaching strategies are important in developing children's ability to think in an historical way. The strategies which best promote historical thinking involve:

(i) meaningful experience: visits to sites and museums from which children can extrapolate and transfer (Bruner 1966, Donaldson 1978, Marbeau 1988).

(ii) Simple open-ended questions about selected key evidence, which will help children to differentiate between knowing, 'guessing', and not knowing (Piaget 1930, Collingwood 1939, Wood and Middleton 1975 , Hamlyn 1982, Doise 1978, 1979, Stones, 1979).

(iii) The use of selected vocabulary at different levels of abstraction (Vygotsky 1962).

(iv) A relaxed non-judgemental atmosphere in which children become confident in their ability to think adventurously (Haddon and Lytten 1968).

A4. CONSISTENT TEACHING STRATEGIES CAN ACCELERATE YOUNG CHILDREN'S HISTORICAL THINKING

If children are taught the key concepts, the questions and methods of answering them which lie at the heart of history, in their simplest form, they will learn to answer them in an increasingly complex way (Bruner 1963, 1966, Hallam 1975, Rees, 1976).

B. THE EXPERIMENTAL DESIGN

B1. THE EXPERIMENT

Two experimental groups in the eight to nine year old age-range were taught by the researcher, who was their class teacher during consecutive years, using the teaching strategies described (B2). A control group in another school was taught by an experienced teacher, using his own methods. The three groups studied the same four units of history. Each unit of study lasted four weeks and on the fifth week,

PAGE

NUMBERING

AS ORIGINAL

the groups were tested using tests designed by the researcher and described in Chapter Two, C.

It is important at this point to explain the way in which the terms 'control' and 'experimental' are used in this thesis. A control group was necessary in order to compare the responses of children taught by the researcher with those of children of the same age who had not experienced her teaching strategies, which are well documented. It would have been highly desirable to have had similarly detailed information about the ways in which the control group was taught, in order better to understand the thinking processes which lay behind their answers, and the reasons why these may differ from those of children taught by the researcher. Unfortunately, this proved to be impossible for reasons explained below. Therefore, in spite of the terminology used, this investigation may be more accurately regarded as a case study than as a rigorous experimental design.

At the time when the research was undertaken, history was seldom taught in primary schools, and before the requirements implicit in the National Curriculum few teachers kept detailed lesson plans. It was difficult to identify someone with an interest in teaching history to young children, who was prepared to teach four specified periods over a given time-scale to a particular age group and, furthermore, to supervise a series of time-consuming tests. The control group teacher was not privy to the design of the experiment. This is partly because ethical issues are involved in explicitly requiring a person to teach in a way the researcher may not consider best practice, and also because informed involvement could influence results. For these and other reasons, it was felt that if the control group teacher were required to give detailed information about his teaching methods this would jeopardise his willingness to co-operate.

Therefore, since there is far more information about the teaching strategies of the researcher than there is about those of the control group teacher, the term 'control group' should be regarded with caution. The research may be more precisely described as a 'case study'.

B2 (iii) Visits

Each unit involved two visits, one to a local site where there was evidence of settlement during the period, and one visit which was further afield. The purpose was, firstly, to give the children as much 'direct' experience as possible of the period, and, secondly, to extend from the locality to a broader understanding of the period. The visits are listed below.

UNIT	LOCALITY	FURTHER AFIELD
1	Farthing Down Coulsdon, Surrey	Grimes Graves, Norfolk
2	Farthing Down	British PreHistory Rooms British Museum
3	Riddlesdown	Lullingstone Roman Villa
4	Bradmore Green	Aklowa (West African Village), Herts.

Details of the local visits are given in the lesson plans (Appendices IX-XII). The visit to Aklowa was chosen to illustrate subsistance farming in a small community.

B2 (iv) Lesson Plans

Each unit consisted of five lessons (lesson plans are given in appendices IX-XII). Three lessons in each unit involved a variety of key evidence about survival and settlement; one lesson involved symbols of myths and beliefs; one involved a local visit in relation to a map (not the map used in the test). Each unit, therefore, raised questions about evidence of location, daily life and belief.

B2 (v) Teaching strategies

(These are given in detail in the lesson plans referred to in B2 (iv)). Key evidence was selected. The children were asked what they knew for certain, what they could 'guess', and what they would like to know about each piece of evidence. They wrote notes under the headings 'evidence' and 'deductions', about the most interesting points. Each lesson lasted about 1½ hours, often on consecutive days. The lessons aimed to teach the children to hold in mind a single image from which they would learn to extrapolate, without over-taxing their memory, since they had to remember the image, and not the argument. In doing so, they would learn to recognise the difference between certainty, probability and not knowing. They would learn to make a variety of supposals and begin to understand validity, and they would learn to support and develop arguments. It was hoped that they would learn to transfer these thinking patterns to new evidence.

The lessons aimed to teach children to search for likeness beneath the surface of diversity and change (Bruner 1966), and to analyse information and order it in a way that permits extrapolation or interpolation or conversion into another form (Bruner 1963).

B2 (vi) Concepts taught

(The lists of taught concepts are given in Appendices V-VIII).
Each Friday, the class was given about ten words to learn as 'spellings', to be tested the following Friday. They had been selected as key concepts for the following week's discussion. They were explained, discussed and looked up in dictionaries before being copied down. There were three 'levels' of concept: concrete, abstract and superordinate. These criteria and the fluidity of the hierarchical levels are discussed in Chapter One A3 (ii). Discussion encouraged children to recognise similarities and differences in particular examples (of Stone Age

tools, for example), based on specific instances (e.g. pictures of tools, and tools seen at Grimes Graves), and to formulate a relationship between concrete and abstract (between emmer, spelt and pulses, crops and food, and agriculture, for example). Beliefs were discussed in relation to specific examples, since they do not have a prototype as concrete categories (Hampton 1981).

B2 (vii) The integrated curriculum

(Plans for the integrated curriculum for each unit are given in Appendices I-IV).

Bruner, like Phenix (1964) stresses the need to be aware of the relationship between history and other disciplines; understanding it in a way that "permits many other things to be related to it meaningfully." (Bruner 1963, p.7).

The curriculum webs show how the science aspect of the curriculum gave the children the opportunity to think, through practical experience, about the implications of technology and change: painting with oxides, preserving berries, making pots, grinding corn for bread, carding, spinning, weaving, dyeing, and so on. Beliefs were discussed as 'Religious Education', helping children to consider both the shared needs, fears and uncertainties of the human condition, and the reason for particular responses to them at different times.

Language included a class novel based on the period - an opportunity to differentiate between evidence and fiction. It also involved ideas and moral issues of each period. 'The Dream Time' (H. Treece) is about trying to explain the values in creativity, in symbols, the power of ritual and the need to explain life. In 'The Changeling' (R. Sutcliffe), we have ritual and sacrifice, and conflicting loyalties; 'The Bronze Sword' (H. Treece) shows human qualities - loyalty and mercy - across the divide

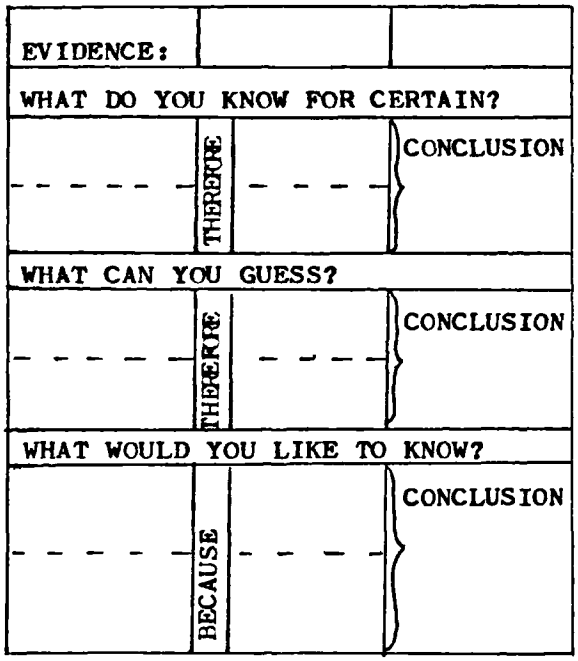
of Romans and British conflict. The aim was to help children to consider the feelings, thoughts and beliefs of other times.

Evidence was observed and recorded through a variety of art techniques in order to help children to observe carefully and store images. Mathematics involved estimation, scale and measurement based on buildings and maps, and speed and distance calculations for projectiles and journeys, recorded in different ways. Geography involved geology (the differences between chalk and clay soils), the vegetation and animals each supported, the significance of location in relation to relief, geology and water supply, and the influence of man on the landscape and vice-versa.

C. THE TESTS

C1. WRITTEN EVIDENCE TESTS

See Appendix XIII for examples of a completed test sheet. This test was set out on a piece of A4 paper divided horizontally into three equal sections. In the first section, the child was asked 'what do you know FOR CERTAIN from this piece of evidence?' In the second section, he was asked 'what can you GUESS about it?', and in the third section, 'what would you LIKE to know about it?' Each of these three sections was also divided in two by a broken line (in the first two sections), in order to encourage two answers to each question. The paper was also divided into three equal parts vertically. A 1 cm. space between the first two vertical sections was labelled 'therefore' for questions one and two, and 'because' for question three. The third vertical section was headed 'conclusion'.



This layout was intended to encourage the ability, which has been recognised as emerging at this age (Piaget 1926, Shif 1935) to use a logical connective to form an argument based on a premise. It encourages the child to form two such arguments, and gives the opportunity to use an abstract or superordinate concept to synthesize the two statements. It also helps the child to make a distinction between knowing, guessing, and not knowing. (Peel (1960) sees a transitional stage between Describer and Explainer thinking, of justified hypothesis and recognised logical possibilities, and investigates whether this is a sequence of difficulty.) Piaget (1930) sees increasing awareness of what we can know and what we can learn at the concrete stage. This approach is similar to that used in an earlier study (Cooper 1982), in that the answer sheet is structured to encourage the optimum response and make clear what is required. This answer sheet, therefore, encourages sequential thinking of the kind Collingwood (1939) defined as lying at the core of historical enquiry, but it also makes it possible to evaluate the thinking processes which were taking place, even if the

argument was not logically set out in the correct spaces.

Robin Campbell (in Donaldson 1978) had similarly looked behind children's separate statements for examples of two premises and an implied 'therefore' conclusion. He taped their comments over three months, when listening to stories, and pointed out that "You're not looking at the story. Why aren't you reading it?" is based on the reasoning that: (1) if you read a book you look at it, (2) you're not looking, therefore (3) you're not reading.

At the end of each unit, the children in the control group and the two experimental groups were given the same five kinds of evidence to write about. They were tested on five consecutive days between 9.30 and 10 a.m. There was no time limit but most children took about half an hour. The children worked in silence, unable to see each other's work. (The instruction sheet for administration of the evidence tests is given in Appendix XL.) Although the children had experience of discussing each kind of evidence, the test evidence was new to them and never directly parallel to anything discussed already. Examples of each piece of evidence are given in Appendices XIV-XXXIII.

(Diagram over)

Diagram 4

Diagram showing evidence used in written and oral evidence tests.

UNIT	TEST 1 ARTEFACT	TEST 2 PICTURE	TEST 3 DIAGRAM	TEST 4 MAP	TEST 5 WRITING
1	Slide. Palaeolithic flint hard axes c 200,000 BC Museum of London. Slide OL91	Slide. Font de Gaume Lascaux. Ray Delvert S. Lot.	Stone circle. The Druids Circle. Caernarvon. Stone circles of the British Isles. A.Burle	Map showing site of neolithic artefacts on North Downs	Petroglyphics from 'How Writing Began Macdonald
2	Bronze helmet (1 BC) Slide BM	Uffington Horse photos	Little Woodbury, Iron Age House plan Wilts. In Cunliffe, R.K. 1974	Lynchets of Iron Age Fields Butser Hill Hants.	Strabo 1.4.2. Description of British exports
3	Shield boss found in River Tyne. Slide BM.	Detail from frieze of great dish, Mildenhall. Slide BM PRB 47	Villa plan Chedworth, Gloucs.	Roman roads across South Downs	Tacitus Annales XII 31-40 Boudicca Revolt
4	Replica of Sceptre. Sutton Hoo ship burial. BM Slide MZ 18	Illuminated manuscript of Harvest made by BM F21985	Plan Saxon Church Cirencester	Saxon settlements in Surrey	Beowulf slays Grendel Penguin 1973 trans 824-838

Petroglyphics were given as the evidence of Stone Age writing because, although they cannot be directly compared with written evidence, the children could think about the significance of language, communication and the problems of understanding the thoughts of another time. It was difficult to find examples of a similar level of detail and complexity for each unit, but I think I succeeded, with the possible exception of the Iron Age lynchets map, which had less detail than the other maps The sequence of evidence for the five tests then was from the concrete to the increasingly abstract and possibly, therefore, increasingly difficult.

It is true that slides cannot be concrete, but the children had visited sites and museums and seen tangible evidence. It was not, however, possible to bring this into school, so the slides of artefacts are an approximation to concrete evidence. Historical evidence, in any case, does not become evidence because it is touched, but because it is discussed.

C2. ORAL EVIDENCE TESTS

C2 (i) Discussion groups led by the teacher

The children taught during the first year of the experiment by the researcher, who was their class teacher (experimental group 1), made a tape-recording of a discussion of each piece of evidence used in the written evidence tests, in groups of about five. The researcher had prepared her own written answers to each of the evidence tests, and tried to steer the discussion, in the light of these, so that the children would be helped to form logical premises and arguments, and use the synthesizing concepts they had been taught, through interaction, to produce the highest level of response. The discussion lasted half-an-hour, and took place between 1.30 and 2.00 p.m.

C2 (ii) Discussion group with no adult present

The class taught by the researcher during the second year of the experiment (experimental group 2), made tape-recordings of discussions of each piece of evidence, in which no adult was present. They were simply told to 'discuss the evidence'. They returned when they had finished, after about half-an-hour.

C3. THE EMPATHY TEST

This was a story-writing test, given at the end of each unit, to experimental group 2. The children were given a piece of evidence and asked to write a story about it. In each case they had been given

enough background information during the unit, from evidence discussed, visits, the class novel, and reference books, to attempt to describe something of life at the time (clothes, houses, etc.). The evidence chosen for the story-writing test was also concerned with religion, beliefs, myth and ritual, so that it invited the child to try to explain these through the eyes of someone at the time. They had already had this opportunity during discussion in each unit (cave paintings, stone circles, the significance of the horse as an Iron Age symbol, Roman Gods and legends, Bede and the early Christian church).

The story gave the children the chance to piece together background detail into a coherent imaginary picture, and to try to explain the ideas and beliefs of the people in a way that would span the levels of imagination and empathy suggested by Lee (1987) and Shemilt (1984). It also takes into account that children write narrative easily in the first person (Wade 1981), and that there is a possibility that projection may be a way into historical imagination (Lee 1984). The evidence used as a basis for each story is given in Appendices XXXIV-XXXVII. The Empathy Test was done between 11 a.m. and 12.30 p.m. There was no time limit. The children worked in silence.

UNIT	EVIDENCE	TITLE
Stone Age	Barnack Grave. BM Postcard*	The Death of the Archer
Iron Age	Stanwick Horse Mask C/PR/023	The Tribe of the Horse
Roman	Visit to Lullingstone Roman Villa**	A day in the life of Livia, a Roman lady in Lullingstone.
Saxon	Bede. The Conversion of Edwin of Northumbria	Christianity of Idols: The Choice is Yours

*Drawing of grave goods, pottery beaker, archer's wrist guard, whale-bone pendant, charred wood around skeleton.

** Statues and votive pots containing bone and snail shell in underground chapel. Wall paintings of goddesses of the spring (well).

Table (j) Table showing tests used in experimental design

TERM	YEAR 1	CONTROL	EXPERIMENTAL GROUP 1		
Autumn 2	UNIT 1	5 written evidence tests	5 written evidence tests	5 LED oral evidence tests	
Spring 1	UNIT 2	"	"	"	
Spring 2	UNIT 3	"	"	"	
Summer 1	UNIT 4	"	"	"	
TERM	YEAR 2		EXPERIMENTAL GROUP 2		
Autumn 2	UNIT 1		5 written evidence tests	5 UNLED oral evidence tests	Empathy Test
Spring 1	UNIT 2		"	"	"
Spring 2	UNIT 3		"	"	"
Summer 1	UNIT 4		"	"	"

(D) The Pilot Study

This was undertaken with a class of 8-9 year olds in the school in which the main study was done during the two following years with children of the same age-range. During this year, teaching materials were collected, lesson notes recorded and concepts selected in relation to each lesson. Evidence tests were devised. These were assessed by another marker.

Reliability between the researcher and an independent observer was calculated using Cohen's (1968) Kappa coefficient across the nine categories of scores used (Table 1). The value for Kappa is 0.764 with a Z value of 14.46, showing a very high degree of agreement between the raters.

Table 1

KAPPA POLYCHOTOMOUS DATA: TWO RATERS

Reliability: Map Unit 1

FREQUENCY TABLE FOR RATERS

		Rater 2							
		1	2	3	4	5	6	7	8
9									
Rater 1									
	1	3	1	1	0	0	0	0	0
0									
	2	1	10	0	0	0	0	0	0
0									
	3	0	0	2	0	0	1	0	0
0									
	4	0	0	0	4	1	0	0	0
0									
	5	0	0	0	0	1	0	0	1
0									
	6	0	0	0	0	0	6	4	0
0									
	7	0	0	0	0	0	0	8	0
0									
	8	0	0	0	0	0	0	0	6
1									
	9	0	0	0	0	0	0	0	0
3									

Total Observations = 54

The value for kappa is:

k = 0.764

For testing the hypothesis that k = 0:

S.E.(k=0) = 0.053

z = 14.46

(E) Description of the Sample of Children

The experimental design employs three groups and consists of two experimental groups (taught and assessed by the researcher), and one control group (taught by another person [but assessed by the experimenter]). The design will give some indication of any differences due to teaching style and method as well as checking on possible secular differences as the experimental groups were taught in consecutive years.

All groups consisted of 20 children chosen at random, in the 8-9 age-range. The two experimental groups were from the same school and were taught using the same lesson plans and teaching strategies as discussed in Chapter 2 1(b). The control group was a parallel group from another school taught by an experienced teacher using his own methods in teaching the four units of history. They were taught history as a separate subject from two traditional text books: Cavemen to Vikings, (J. R. Unstead), and Living History, (I. Holmes). They did not go on any visits.

As each group was a section of a complete class and therefore a non-random group, it was considered advisable to investigate the ability level across the classes. Each class was given the NFER BD test 28 to provide a measure of general ability. A one-way analysis of variance was used to test the null hypothesis of no difference in general ability between the groups. The F value, 0.8 df 2,57, shows there to be no difference between the groups so the null hypothesis is not rejected. The data and analysis of variance table is given in Appendix XLvi (i) and a summary of the descriptive statistics

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in Table 2 below.

Table 2. Summary Statistics for the Three Groups

	Mean	s.d.	Range
Experimental Group 1:	106.55	15.40	80-133
Experimental Group 2:	111.20	12.93	88-135
Control Group:	112.05	15.95	75-136

Although no overall differences in ability level were found, it was decided to investigate the application of analysis of covariance using the NFER score as the covariate to a sample of responses.

In the first instance, a set of data was chosen at random. This set consisted of the response measures for the three groups over the three questions dealing with 'Artefacts' in the Saxon period. Two-way analyses of variance and covariance, with one between groups and one within groups, repeated measures using the NFER scores as covariate, were computed. The null hypothesis of no differences between and within groups and no interaction were set up.

Table 3. Comparison of Analysis of Variance and Analysis of Covariance.

Unit 4. The Saxons. Qu.1-3 Artefact

A=Groups
B=Questions

(1) A ALYSIS OF VARIANCE TABLE

SOURCE	SS	DF	MS	F
BETWEEN SUB ECTS				
Main Effect A	80.03	2	40.02	5.97
Subj. with. A	382.25	57	6.71	
WITHIN SUBJECTS				
Main Effect B	43.20	2	21.60	10.72
Interaction A x B	67.77	4	16.94	8.41
B x Subj. w. A)	229.70	114	2.01	
Total	802.95	179		

The full analysis tables are given in Appendix XLVI (ii). The analysis of variance between groups was significant, $F = 5.97$, df 2 and 57, $p < .05$, as was the difference between questions within the groups, $F = 10.72$, df 2 and 114, $p < .05$. The interaction term was also significant, $F = 8.41$, df 4 and 114, $p < .05$. In each case the null hypothesis was rejected.

The analysis of covariance between groups showed an enhanced value of $F = 7.96$, df 2 and 56, $p < .05$.

Table 4

(2) ANALYSIS OF COVARIANCE TABLE

Source	SS	DF	MS	F
Between Subjects				
Main Effect A	94.89	2	47.44	7.96
Subj. with. A	333.91	56	5.96	
Within Subjects				
Main Effect B	43.20	2	21.60	10.72
Interaction A x B	67.77	4	16.94	8.41
B x (Subj. w. A)	229.70	114	2.01	
Total:	802.95	178		

Fig. O (i) Graph showing raw cell means and adjusted means for questions 1-3. Unit 4, artefact, for Control Group

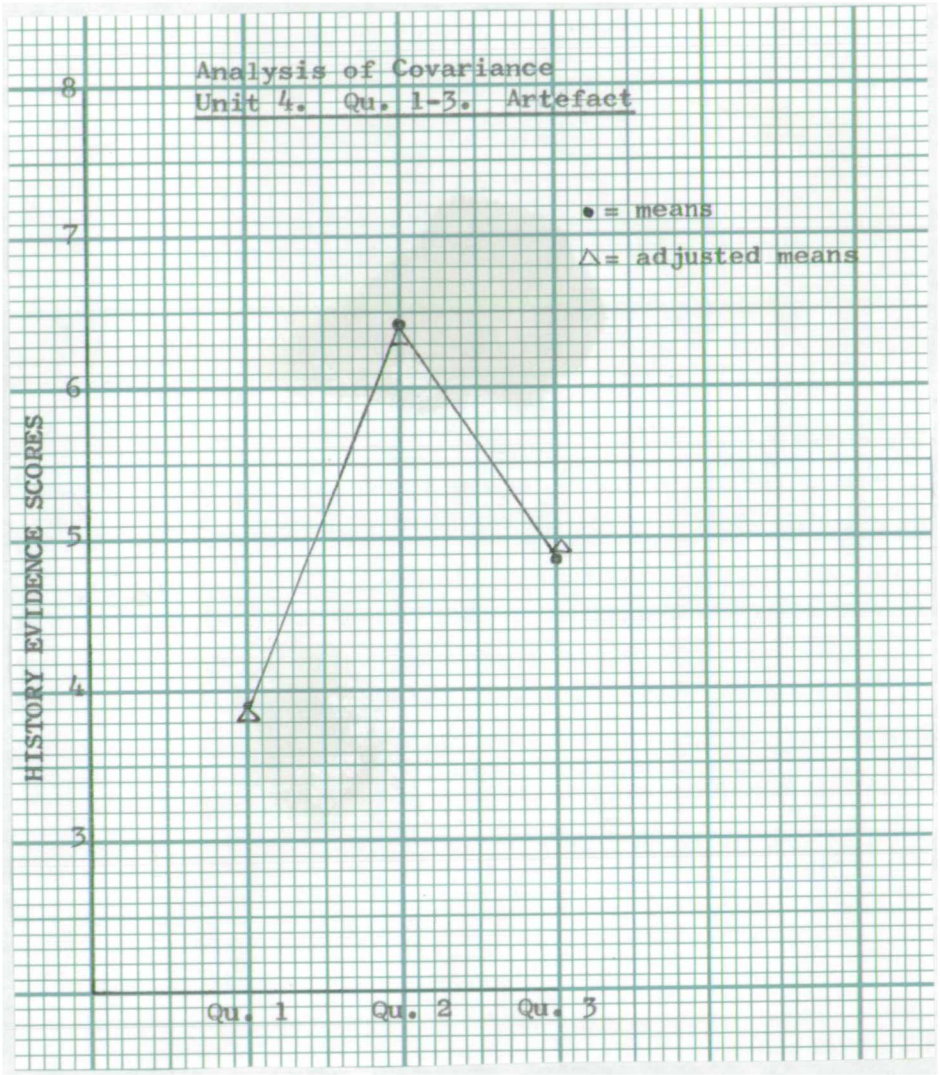


Fig. O (ii) Graph showing raw cell means and adjusted means for questions 1-3. Unit 4, artefact, for Experimental Group 1

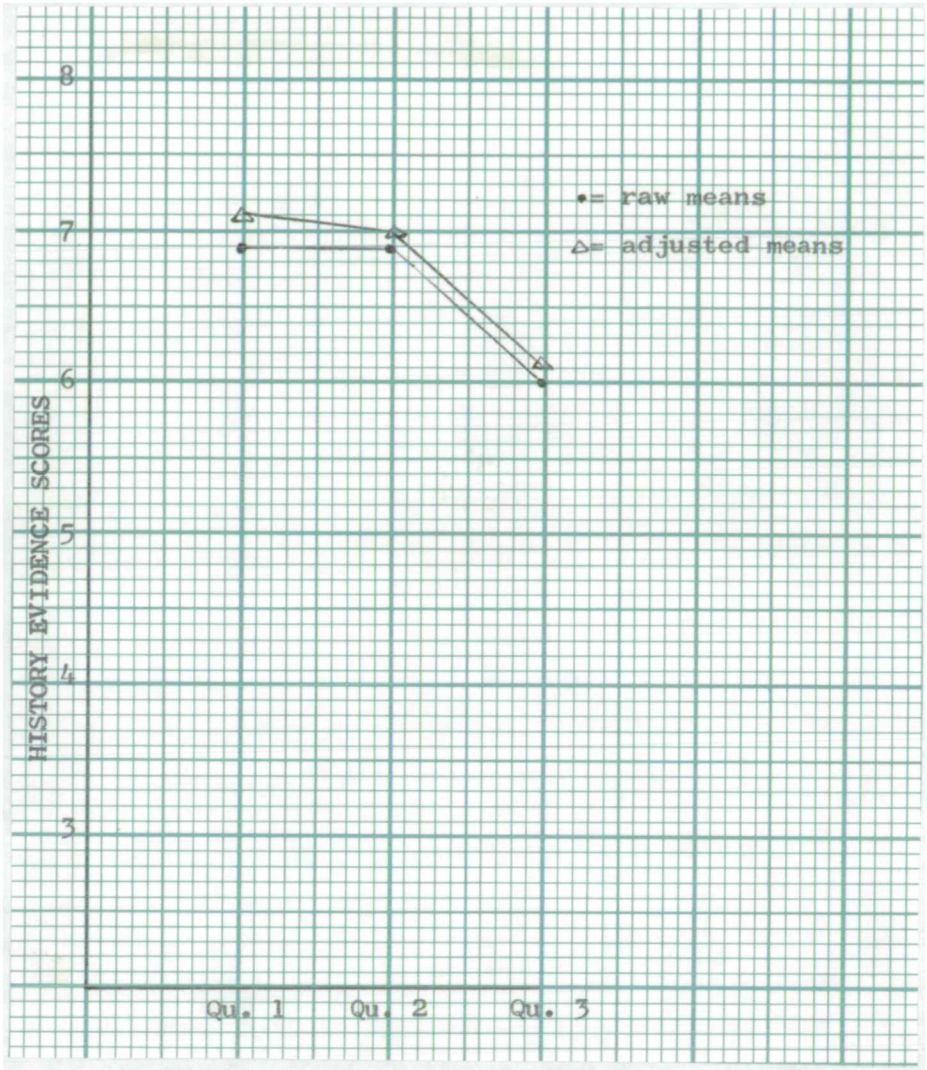
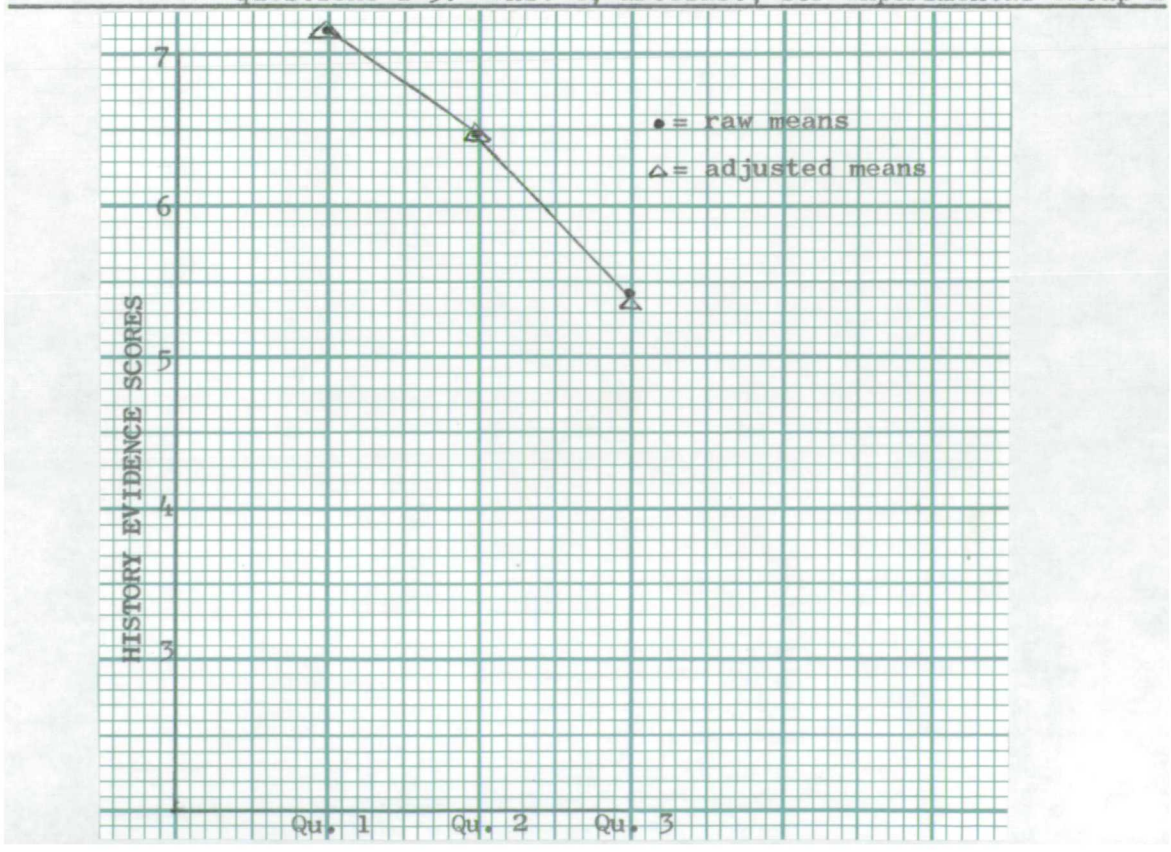


Fig. O (iii) Graph showing raw and adjusted means for questions 1-3. Unit 4, artefact, for Experimental Group 2



An examination of adjusted means shows that the control group (A1) did less well than either of the other two groups. Application of a test for differences between adjusted means (Winer, 1971, pp 800 ff.) shows that the differences between control (adjusted) mean and the two experimental adjusted means are both significant, $F(c-1) = 12.87$, $F(C-2) = 7.6$ (both with 1 and 57 df), $p < .05$. The difference between the adjusted means for the two experimental groups is not significant, $F = 0.69$, df 1,57.

[Test values (TV1 - 3) are found from:

$$6.83\{(2/20x3) + (\text{mean cov. } Xa - \text{mean cov. } Xb)^2/37563.25\}$$

with means Xa = 112.05, Xb = 106.55, Xc = 111.2
so: result for Xa-Xb: TV1 = .233 (Cont - 1)
Xa-Xc: TV2 = .228 (Cont - 2)
Xb-Xc: TV3 = .232 (1 - 2)

The test is $F = (\text{Adj. mean } a1 - a2)^2/TV$

Then: $F = (\text{Adj Mean Cont - adj. mean Expt } 1)^2/TV1$
$(5.007 - 6.72)^2/.233$
$2.934/.233 = 12.59$ with 1 and 57 df

$F = (\text{AMCont - AM Exp } 2)^2/TV2$
$= 7.6$ with 1 and 57 df

$F = (\text{AMExpt1 - AMExpt2})^2/TV3$
$= 0.69$ n.s with 1 and 57 df]

The second exploratory analysis was of group differences for the first question across each of the five presentations. Again, the NFER measures were used as the covariate in a repeated measures design. The results are shown in full in Appendix XLVI (iii). The analysis of variance between groups, $F = 12.30$, df 2 and 57 is significant $p < .01$.

Table 5 Table of analysis of variance on question one, on each unit

B: repeated measures
A: groups

(1) ANALYSIS OF VARIANCE TABLE				
Source	SS	DF	MS	F
Between Subjects				
Main Effect A	197.17	2	98.58	12.30
Subj. with. A	457.03	57	8.02	
Within Subjects				
Main Effect B	16.65	4	4.16	1.62
Interaction A x B	83.53	8	10.44	4.06
B x (Subj. w. A)	587.02	228	2.57	
Total	1341.40	299		

This value of F is enhanced by the removal of the covariate, F = 17.06, df 2 and 56. The within groups repeated measures (presentations) factor was not significant but there was a small, but significant, interaction term.

Table 6 Analysis of covariance on question 1 of each unit

B: repeated measures
A: groups

Analysis of Covariance Table				
(2) ANALYSIS OF COVARIANCE TABLE				
Source	SS	DF	MS	F
Between Subjects				
Main Effect A	220.46	2	110.23	17.06
Subj. with. A	361.84	56	6.46	
Within Subjects				
Main Effect B	16.65	4	4.16	1.62
Interaction A x B	83.53	8	10.44	4.06
B x (Subj. w. A)	587.02	228	2.57	
Total	1341.40	298		

Tests on adjusted means showed the same patterns of results as in the previous analysis with a significant difference between the control group and the two experimental groups but no difference between the experimental groups.

Given these results comparing the use of analysis of variance with analysis of covariance, it was decided, as large significant differences were being found between groups, that for further analyses the straightforward analysis of variance would be used. However, careful consideration would be given to the magnitude of the F values and also to any interactions which are significant.

F. THE ASSESSMENT CATEGORIES

F1. THE EVIDENCE TESTS

F1 (i) The written evidence tests

A ten point scale was devised. This was used to measure the written and verbal evidence tests. It was based on Piaget - most closely on 'The Language and Thought of the Child' (1926) and 'Judgement and Reasoning in the Child' (1928); on the work of Shif (1935) on causal connectives and taught concepts; and on the work of Vygotsky and his successors on concept development. It also takes into account previous research relating cognitive psychology to history, but is not able directly to adopt anyone else's scale because other researchers were concerned with older children, or with a large age-range, or with a greater range of historical tasks, often involving motive and comparing sources, or else, purely with concept development. The scale attempts to analyse in detail the embryonic stages of learning to form arguments about historical evidence and to define three main stages and transitions between them. The examples given were written answers to the Stone Age map question. Unit 1, test 4 (Appendix XVII).

The questions, given in Appendix XIII, discussed in Chapter Two C1, and explained in the instruction sheet for the administration of the evidence tests (Appendix XL) were:

Question 1: What do you know FOR CERTAIN from this evidence?

Question 2: What can you GUESS from this evidence?

Question 3: What would you LIKE TO KNOW about this evidence?

The ten levels were:

LEVEL 1. EGOCENTRIC Illogical. Leaps to (unreasonable) conclusion in one bound without attempting to prove or check. Piaget (1926).

Peel (1960) 'pre-operational' responses, illogical and unrelated.

Lodwick (in Peel 1960) Seven-year-olds were unable to reverse operations.

Thompson (1962) Misunderstanding and tautology at a 'pre-operational' level.

Booth (1969) At the lowest level, there was no attempt to apply the information given.

Rees (1976) No explanation given, at lowest level.

Cooper (1982) Illogical responses at lowest level.

(The examples given at each level are composite and are not all from the same child's response).

Ex. Question 1: "I know for certain they play games."

Question 2: "I guess they could make a clay bike."

Question 3: "Was the top of the map meant to be in the shape of claws, because they look like claws. They mit of kept the animals out because it looked like a humens hand and they thought it mit kill them."

(Answers at this level show no understanding of the kind of spatial information the map represents, or of time, or that deductions must be related to the information given. They have not understood, in any of these aspects, the 'rules of the game').

LEVEL 2. DESCRIPTIVE (I) Attempt to communicate intellectual processes to reader; these are factual and descriptive and show incipient logic, but this is not clearly expressed.

Piaget (1926) 'adapted information'.

Ex. Question 1: "I know for certain they must have built caves on the steep slope, under a river, with a view of animals drinking." (There was no evidence of caves, the slope could not be under the river, but she is trying to work out where people could have lived and why).

Question 2: "I guess the clay area is there to make pots." (Meaning there is clay and therefore they could make pots).

Question 3: "I would like to know if there is any fish in the river, and how long the river is, because it could swim for miles." (To wonder if there are fish is relevant, but not how far they could swim!).

LEVEL 3. DESCRIPTIVE (II) Restates evidence given logically, but this is factual, descriptive and physical, and does not add anything by inference, or explain it.

Piaget (1926) the 'adapted information' (level 2) gives rise to dialogue in which the child, spoken to in a proposition, talks about something that was treated in this proposition in statements of fact or description, but without supporting his argument with a reason.

Peel (1964) At a concrete level, children restate the evidence in the story.

Thompson (1962) At a 'concrete' level, children could reverse their thinking, but would only repeat information given.

Booth (1979) At the second level, no attempt to go beyond the information given.

Ex. Question 1: "There are clay areas, and chalk areas, and steep slopes."

Question 2: "I guess the cliffs are big."

Question 3: "I would like to know why they chose that spot."

LEVEL 4.

PRIMITIVE ARGUMENT I Premises which go beyond restating factual or physical information given.

Piaget (1926) says, "primitive argument begins with the statement of an opinion, but the explanation for the deduction is only implicit or expressed in disconnected statements."

Ex. Question 1: "They had rivers to get water from." (The underlying thinking here seems to be that rivers (given in the map) provide water, implying that this is a

necessity, and has something to do with the choice of site).

Question 2: "I guess Stone Age people looked for shelter, rivers and chalk." (The thinking here seems to be: there is evidence in the map of slopes (which provide protection), rivers (which provide water), and chalk soil (which is well-drained with sparse vegetation). The children have made these deductions on their visit to Farthing Down. Therefore they guess that Stone Age people selected this site for these reasons).

Question 3: "I should like to know if they kept a store of clay." (I know that Stone Age people could make clay into pots. To do this requires organisation and storage. I should like to know if clay shown in this map was used to make pots).

LEVEL 5.

PRIMITIVE ARGUMENT II Two statements at level 4.

My experience was that children produce a number of 'primitive arguments' before they start using causal connectives.

Peel (1964) "Logical deductions consist of one, two or more propositions which must be assumed to be true, to obtain a further statement which follows logically and necessarily from the first proposition."

Cooper (1982) An increase with age in the number of statements supported by evidence.

Ex. Question 1: "They had water, therefore they could keep healthy. They had neolithic implements. Therefore they lived for a long time." (Here the thinking seems to be that they had a water supply, tools and weapons which would make settlement possible).

Question 2: "I can guess there are lots of trees on the clay, and they keep animals on top."

Question 3: "I should like to know what animals they hunted, and did they eat them out of pottery bowls?"

LEVEL 6

INCIPIENT GENUINE ARGUMENT

Attempt to justify assertion by using conjunction (therefore, or because), but logical connection between the assertion and the evidence is inadequately expressed.

Piaget (1928) The young child (7-8) rarely spontaneously uses 'because' or 'although', and, if forced to finish sentences, uses them as a substitute for 'and then'. This is illustrated in Piaget's story about Niobe, and his experiment asking children to explain proverbs.

Shif (1935) Children who have been taught specialised concepts and consciously taught to use 'because' are more able to use them to complete a sentence fragment ending in 'because'.

Ex. Question 1: "I know there is chalk in most areas because of the weapons they made." (Implying they lived in chalk areas because it contained flint for weapons).

Question 2: "I guess they made pots out of clay. Therefore they learned to make fire." (Making pottery depends on being able to make fire).

Question 3: "I would like to know if they stayed in one place because of the lack of animals maybe." (Meaning, did people learn to farm because the herds they followed became fewer?)

LEVEL 7

GENUINE ARGUMENT I — A statement using 'therefore' or 'because' correctly.

Piaget (1926) Because becomes more frequent at about eight years old, in attempts to systematise one's own opinions to avoid contradiction, and as the result of internal debate.

Shif (1935) Children of eight to nine are able to complete a sentence fragment using 'because' more easily with a taught concept.

Cooper (1982) Increase with age of the number of properly used causal conjunctions.

Ex. Question 1: "There are rivers and steep slopes. Therefore it would be a good place to live, because if attackers came they would fall down the slopes into the river."

Question 2: "I guess there are flints in the chalk. Therefore they could wash the chalk and use the flint for tools and weapons."

Question 3: "I should like to know what animals lived there, because I should like to know what they ate."

LEVEL 8

GENUINE ARGUMENT II — Two premises, each followed by a correctly used causal conjunction. If two premises were given with each followed by an argument connected by a conjunction, it seems that this pattern of reasoning is securely established.

Ex. Question 1: "Chalky ground is not wet, therefore the tools are found there because Stone Age people could live there. And they were near a river, so they could get water to drink."

Question 2: "I guess they lived by a river, therefore they had boats; and that they used the clay, therefore they made pots."

Question 3: No example in Test 4, Unit 1. This example is taken from Test 4, Unit 4. (Map given in Appendix XXXII).

"Why did the rivers dry up, because there are not many droughts in this country. Why didn't the River Wandle (given in map) dry up, because all the other rivers did?"

LEVEL 9

INTEGRATIVE THOUGHT I Attempt to synthesize previous arguments, in the conclusion.

Peel (1960) Explainer stage of weighed arguments using abstract propositions.

Vygotsky et al. A child is finally able to formulate a rule which establishes a relationship between concepts.

Ex. Question 1: "The implements are near water, therefore they had a good water supply, and they are either on or near chalk. Therefore, either man was making his home here, or near here, or had a kind of factory here. So they are choosing good places that are efficient to live in."

Question 2: "I guess they had good shelter from the cliffs. Therefore they would be safe. And they had a good water supply and land to grow crops on the chalk soil, so they would be able to farm here."

Question 3: No example in Unit 1. The example is taken from Unit 2, Test 4. (Map given in Appendix XXII).

"How much belonged to one person, because they may all have the same amount and they might share it fairly? Who owned it, because it might all belong to the same family?"

LEVEL 10

INTEGRATIVE THOUGHT II Previous arguments synthesized using one of the taught superordinate concepts (e.g. agriculture, community, trade, geology, vegetation). This shows understanding of their component concepts and

abstraction of their common characteristics in a generalised statement, which would result from any similar examples of evidence, and so shows understanding of the key concepts in the study of the period.

Vygotsky and Piaget: Synthesis of statements to create abstract idea.

Taba and Elsey (in de Cecco 1969) Concept formation making inferences and learning to generalise from specific data provide a cumulative sequence in the development of thought.

There was no example in Unit 1. Only 4 responses over the 4 units were assessed at level 10 - these were all to question one. The example given is from Unit 2, Test 3.

Question 1: "They had huts. Therefore they could built huts. They had vegetation. Therefore they had materials to make huts. They had houses, shelter and stores."

(Another example is quoted in the analysis of Unit 2, Test 3, Chapter Three).

F1. (ii) Oral Evidence Tests

The same ten-point scale was used as for the written evidence tests. They were analysed and recorded by dividing the A4 page into ten sections horizontally, representing the 10 levels. A brief note of the main statements made was written under the appropriate level. Arrows to the right show how a premise made by one child is developed as an argument by another child. Arrows to the left show how higher level general statements lead back to another simpler premise which usually then develops as another argument.

This method of recording shows the interaction in the group, building arguments, making generalisations, and moving back and forth between the particular and the general (Bruner 1966, p 49).

The example on the following page shows how the first experimental group's discussion of the map in the Stone Age Unit was recorded and analysed on the ten-point scale. Further examples are given in Appendices XXXVIII (i) and IXL (i), and examples of how these levels are shown in diagramatic form are given in Appendices XXXLIII (ii) and IXL (ii).

EXPERIMENTAL GROUP 1 UNIT 1 TEST 4 MAP LED DISCUSSION: Donna, Carla, Samantha, Max, Bianca, Nerys, Richard

1	2	3	4	5	6	7	8	9	10

What do you know?

N. Where the things were found might not be where they lived. They may have been dropped

M. They had rivers

D. It's muddy around the rivers - on the clay. It was hard to walk along. → N. It's muddy and quite steep It would be difficult to walk down for water. The finds are at the top of a steep slope. There might be flint in the chalk.

C. Chalk for writing on walls. ←

N. They had all they wanted - clay for bowls - rivers for water.

→

N. Where there is chalk there is usually flint.

N. The things were found close together → They probably lived near other people.

What can you guess?

D. If they went hunting they might follow tracks in the mud - and put traps down. → N. There might be birches on the chalk - no trees on top - not enough soil for the roots. They might have used clay like cement.

D. With trees they might have made a shelter.

D. Made boats from birch?

B. Fir trees for bows?

N. Yes is strong and flexible.

D. Blackberries might grow there.

M. Grass for turves.

N. They could farm on the grass tops for bedding (Mr. M. said...)

N. Brown stuff - bracken under the trees. →

N. They might use mushroom milk for wounds.

EXPERIMENTAL GROUP 1 UNIT 1 TEST 4 continued....

1	2	3	4	5	6	7	8	9	10
What would you like to know ?		D. There are rivers	C. They could have eaten crab-apples (saw them with Mr. M). D. and woven grass for clothes. C. or from animal skins. D. Clay for bowls M. How did they dig the clay to make bowls? C. Were people buried at the top of the hill? N. Were the things just dropped there or did they actually live there? R. Did they have a special place to cook?			healing? fishing? N. If so it would tell us where they lived - and if their skeletons were different from ours. D. They might be buried with their weapons. N. Or they might have died working and be holding tools. That would tell us where they lived. Did they live in a tribe?	for worship?		N. In a settlement? M. In a community?

F2. THE EMPATHY TESTS

In order to evaluate these, the levels outlined by Ashby and Lee (1987) were interpreted in the way that the children were expected to respond, using the given evidence for the story. This seemed to show that the stories offered the opportunity to respond at several levels. It was hoped that previous discussion of why people may have believed, thought and behaved differently in the past, which arose, for example, from cave paintings, votive offerings, and historical novels, would enable them to grasp the criteria at issue. The criteria were adjusted slightly in the light of their actual responses, and the four levels were labelled as 'accidental', 'matter of fact', 'detailed matter of fact', and 'significant'. The table below shows Lee's criteria, the researcher's interpretation of them in terms of these tests, and examples of children's responses. The levels are also reflections of Piaget's description of emerging moral values (1932) and of the work of his successors.

Ashby and Lee	Hilary Cooper	Synopses of Answers
Level 1. The 'Divi' Past Actions, institutions seen as unintelligible. No need to try to understand behaviour in the past. Inability to envisage the inherent complexity of human institutions and interactions. Anglo-Saxon oath-taking is 'stupid'. Piaget (1923). At a pre-operational level, the child has no idea rules exist.	'Accidental' The significance of the evidence, which suggests myth, beliefs, ritual, is completely ignored. If mentioned, it is only explained as being there by accident. The child seems unaware that societies have structure, ideas, beliefs or values, at all. Therefore no attempt to explain ideas, or beliefs, in terms of social conditions of the time.	Test I 'The archer was doing pottery. He might have been shaping it with a dagger. The spear was to protect him. Someone came to the door and threw a flint at him, and he fell on the fire.' Test II 'We do this (i.e. wear a horse mask) every evening. Come and have something to eat.'

Ashby and Lee	H.C.	Synopses of Answers
Level 1. Cont....	'Accidental' cont....	
	*(The stairs lead to a chapel and the statues are near pots containing, apparently, votive offerings - a snail and a bone. This had been explained during the visit to Lullingstone).	Test III 'I heard a crash. My mother had tripped down the stairs and smashed our statues at the bottom of the stairs. I tried to help her up but she had broken her leg..*. I called the hospital, or I saw a bone and a snail shell in the deep room. The bone must have fell down when we ate our food.
	*(Coifi the pagan priest has destroyed his temple after the King accepts Christianity).	Test IV 'Oh no. My best temple has burned down. Oh well, there are bad things in life. More people should become Christians now. They could build a new temple*
	*(The sparrow symbolises the uncertainty and brevity and fragility of life!)	or 'a sparrow flew in the hall and out again. Everything was quiet..' *

Ashby and Lee Level 11. Generalised Stereotypes	H.C. Matter of Fact	Synopses of Answers
Actions, institutions understood by reference to a conventional stereotyped account of people's values etc. Personal projection used to explain institutions; no attempt to distinguish between what people think now, and what they thought in the past.	Children mention the significant objects, but in passing, in a matter-of-fact way. They do not reflect on their significance - just accept them as part of a different way of life. There is no recognition that they represent different ideas or beliefs.	Test 1 The children are caught in a time-warp, and see the archer die. They bury him with his things: a bone necklace, a bronze dagger, and a large pot. Or, the archer was killed in a battle with the chief. The archer's wife put some of his things around the fire before they burned him.
Oath-taking explained in terms of religion - religion explains any absurdity so there is no need to explain further.		Test 11 They are praying. The chief is dead and is being burned. There are drums and dancing.
Piaget (1923) At a concrete stage rules are rigid, unquestioned, and unchanging.		Test 111 Britons attack Lullingstone. I went into the deep room. I saw Mars the God of War standing there. He had come to say that men are coming from the war to attack Lullingstone. Test IV Coifi agreed he would try this new thing.

Ashby and Lee	H.C.	Synopses of Answers
		Test IV cont.... A few days later he went a bit nutty and set fire to all the temples.... some tribes fought agains him....the battle was over and the Christians won.
Level 111 Everyday Empathy No distinction between how we see things now and how contemporaries would have seen them. But a genuine attempt to reconstruct a situation and awareness of the kinds of ways people might react, frequently with some personal projection. 'What would it have been like for me if I'd been there?' Closer application to particular circumstances than in level 11. Genuine attempts to harness facts to Understanding. Children try to explain oath-taking	Detailed Matter of Fact There is more description of artefacts, etc., based on knowledge of the period more complicated narrative and more personal projection, but still no attempt to explain different ideas and beliefs.	Test 1 'In a village there lived a boy called Balloo. He was learning to do archery. Every 3 weeks he would get a feather. One day he was given a brilliant surprise - a wristguard. The chance to be a hunte with the other archers... Test 11 'They tied me to a pole. I could see a horse mask. They set light to me. I screamed. I said I will do no harm. They let me go and explained 'the bone give us power over evil tribe Test 111 'I went to the deep room for the first time. It was spooky. I

Ashby and Lee	H.C.	Synopses of Answers
Level 111 cont....		111 cont.... had to walk down a ladder It felt as if it would go on for ever...I looked around. I thought I saw a rat...my dad's a Roman veteran...he likes making us pray to Venus and Bacchus...description of funeral of Julius the chief slave...the service went on for at least 3 hours...etc.
Peter Knight (1985) found in asking children why Spartan babies were abandoned, that most eight-year-olds thought Spartans would behave just as we do.		Test IV Coifi appears on a black stallion. He is headed to the temple and beyond...I have burned away the old gods...he is mad. Stone him. Years later, in a Christian church, "Dear God, the One and Only God..."
Level IV Restricted Historical Empathy Goals, values and beliefs in the past were different from ours. Attempts to reconstruct some rationale for different goals, etc. Assessment of gains and losses accruing from	Significance Attempt to explain significance of symbols - what ideas they represented, and why these were held.	Test 1 No example. This would have attempted to describe the afterlife the archer may have expected; the reasons for the grave goods, and the symbolism of the whale-

Ashby and Lee	H.C.	Synopses of Answers
Level IV cont....		Test 1. Cont....
alternative sets of behaviour. But attempts to explain different behaviour unstable.		bone pendant.
	*(This child tries to work out why the people thought the horse god had given them water, and also makes it clear he understands that really the spring occurred naturally i.e. why they believed in this god and why he does not)	Test 11 *The horse was a symbol, their god. They prayed to him. They had no water - people died and the animals fled. Then a spring opened. When the tribe was attached, they put horses heads on the fences. I said "This will not do you any good" but they wouldn't listen to me."
	*(Another child is aware the horse is a 'symbol' and tries to work out, 'of what'. He also makes it clear that he does not accept the symbol and criticises it from his own standpoint).	or *I said "Why is your horse your symbol?" 'He is alert'. I said "So are most animals." He said, "You're tricky." He was worshipped by our ancestor I said "Do you do everything your ancestors do?" He did not like that so he went.
	*(This boy attempts to explain people's aspirations and why the statues and pots are believed to have power).	Test III *'I arrived at Lullingstone in time for the service in the deep room. Pots are stored there because the owner thought he could trap their Gods and become

Ashby and Lee	H.C.	Synopses of Answers
		Test III cont....
		rich and powerful'.
	*(This child is trying to explain the reasons for conversion to Christianity. He is a Muslim!).	Test IV *'Coifi the chief priest is mad for becoming Christian', came the chant. What happens if the Christian God's medicine doesn't work? What happens if he has heavier punishments? He might make the winds blow and wreck those with bad men on. Will he reincarnate us and give us a second chance as our own Gods do? What happens if he can't cure drought or illness or famine?

Chapter Three

Findings

A. Analysis of Unit One, The Stone Age

A1. Statistical Analyses

Unit 1. The Stone Age

(a) Comparison of the written evidence scores of the control and the experimental groups.

(b) Comparison of responses to the three types of question, within the three groups.

(c) Comparison of responses to the five types of evidence within the three groups.

(d) Discussion of significant interactions.

A2. Concepts: Analysis of concepts used by control and experimental groups in written evidence tests and by the experimental groups in the led and unled discussions.

A3. Analysis of written evidence tests.

(a) Test 1. Artefact. Palaeolithic Hand Axes.

Examples of responses by each group at each level.

(b) Test 2. Cave Painting.

Examples showing how it may be necessary to look for underlying thinking processes, in order to evaluate an answer.

(c) Test 3. Diagram of a Stone Circle.

Examples show how teaching methods based on discussion reveal a richer variety of answers than the control group, even when the discussion is not based on direct experience.

(d) Test 4. Map of the North Downs.

Examples show how the experimental groups' visit to Farthing Down helped them to interpret this map.

(e) Test 5. Petroglyphics.

Examples show how the answers of highly intelligent children may not reflect stereotyped teaching, but that discursive methods improve the answers of the least able.

A4. Analysis of Oral evidence tests.

(i) Comparison of content of led and unled discussions.

(ii) Comparison of structure of led and unled discussions.

(iii) Comparison of written and oral evidence tests in each experimental group.

A5. Analysis of Empathy Tests, Unit 1.

A1. Statistical Analyses

Results are shown for each of the Units in turn. The analysis in each case used a three-way repeated measures design (two between, one within). The complete design had 3 x 3 x 5 levels. On the few occasions when missing data occurred, a mean value for the group in that cell was used.

Unit 1. The Stone Age

Table 7 Three way analysis of variance. One between groups (classes) (A), and two within groups: question type (B) and type of material (C). This is a 3 x 3 x 5 cell design.

ANALYSIS OF VARIANCE TABLE

SOURCE	SS	DF	MS	F
BETWEEN SUBJECTS	1841.03	59		
Main Effect A	377.78	2	188.89	7.36
Error for A	1463.25	57	25.67	
WITHIN SUBJECTS	3197.73	840		
Main Effect B	538.65	2	269.32	70.08
Interaction A x B	13.75	4	3.44	0.89
Error for B	438.13	114	3.84	
Main Effect C	111.14	4	27.78	7.60
Interaction A x C	67.74	8	8.47	2.32
Error for C	833.52	228	3.66	
Interaction B x C	73.64	8	9.21	3.85
Interaction ABC	31.06	16	1.94	0.81
Error for BC	1090.10	456	2.39	
Total	5038.76	899		

In this analysis, the classes are the first main factor (A); questions asked were the second factor (B), and the repeated measures factor (C), was the type of evidence. The results are shown in full in Appendix XLVI(iv).

Although some interaction terms were found, the significant main effects will be discussed first.

(a) Main Effect A. A comparison of the written evidence scores of the control and experimental groups

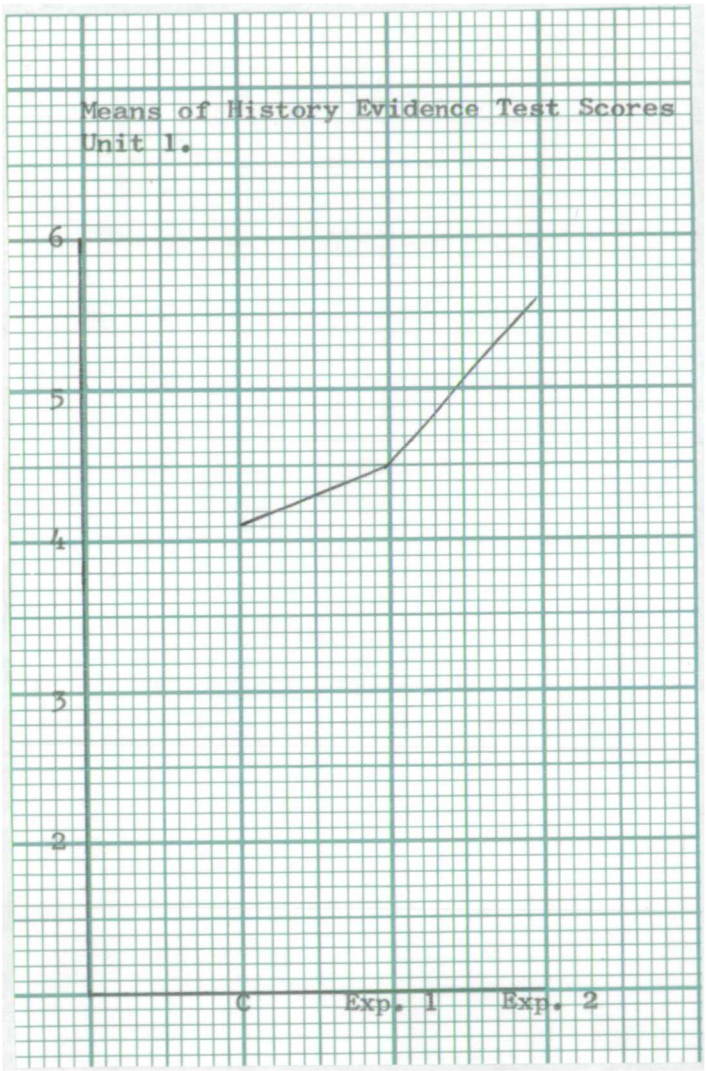
The null hypothesis that there is no difference between the groups is rejected. ($F = 7.36$ df 2,57 $p < .05$).

The graph (Fig. 1 (i)) shows that the mean for the control group is slightly lower than the mean for experimental group 2. The Sheffé test for multiple comparison shows that there is a significant difference between the means for the control group and experimental group 2, and for experimental group 1 and experimental group 2, but not between the control group and experimental group 1:

(a_1)	vs	(a_2)	n.s	$F^1 < 1$
(a_1)	vs	(a_3)	sig	$F^1 = 13.15$
(a_2)	vs	(a_3)	sig	$F^1 = 7.07$

The difference between the scores for the experimental groups who had both been taught in the same way is probably due to three factors. The group contained several very disturbed children whose behaviour in a test situation was erratic; the group was more difficult to motivate than experimental group 2, and took longer to respond to my teaching style. And, finally, my strategies may have become more effective as I became more confident and familiar with them.

Fig. 1 (i) Graph showing means of history evidence test scores for control and experimental groups, Unit 1.



(b) Main Effect B. A comparison of responses to the three types of question within the three groups: Question one, what do you know for certain? Question two, what reasonable guesses can you make? Question three, what would you like to know?

The null hypothesis that there is no difference between the three types of question in rejected. ($F = 70.08$, df 2, 114, $p < .05$). The graph (Fig. 1 (ii)) shows that the children found it easiest to say what they knew for certain about evidence, and only slightly more difficult to make reasonable guesses about it. They found it much harder to say what they would like to know.

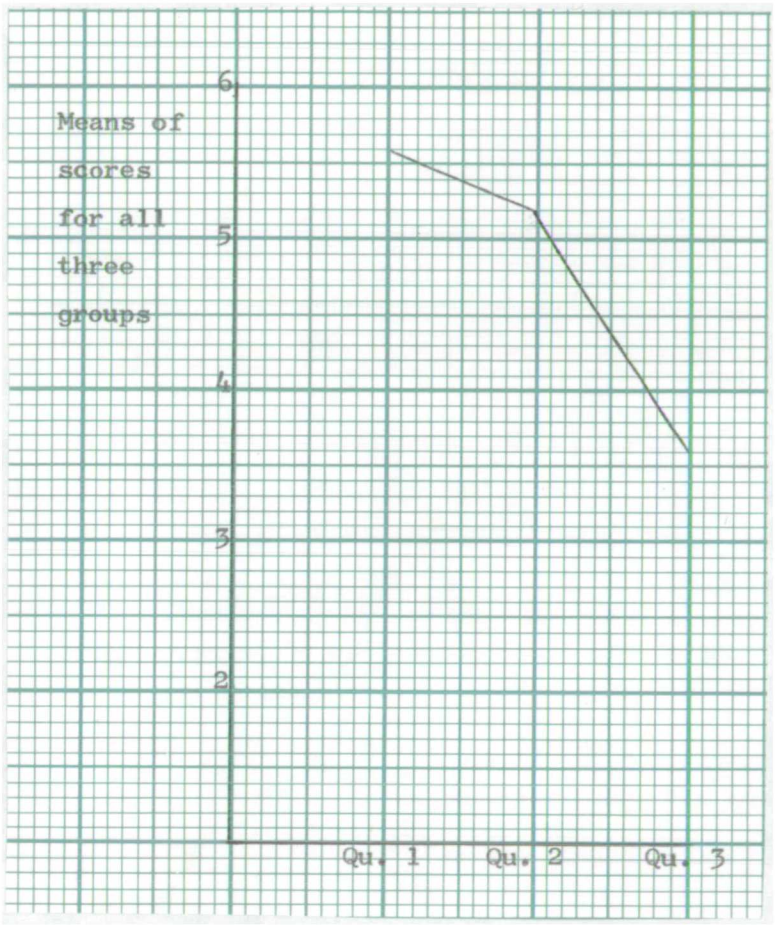
The Sheffé test for multiple comparisons shows a significant difference between the means for questions 1 and 3, and between questions 2 and 3, but not between questions 1 and 2.

b_1 vs b_2 n.s $F^1 < 2$

b_1 vs b_3 sig $F^1 = 122.56$

b_2 vs b_3 sig $F^1 = 100$

Fig. 1 (ii) Graph showing means of scores for all three groups for each type of question, Unit 1.



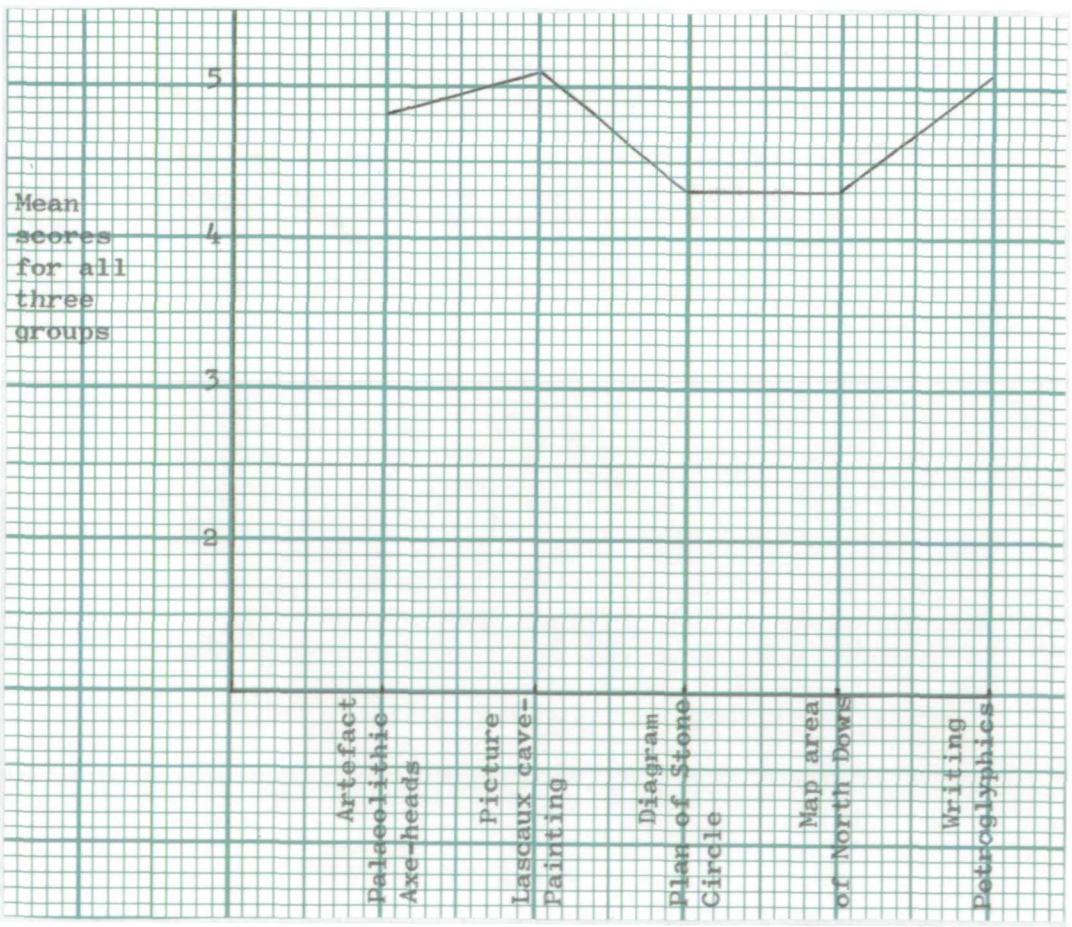
(c) Main Effect C. A comparison of responses to the five types of evidence within the three groups: artefact, picture, diagram, map, writing.

The null hypothesis that there was no difference in the children's responses to different kinds of evidence is rejected.

($F = 7.60$ df 4, 228 $p < .05$).

The graph (Fig 1 (iii)) shows that children found the picture of the cave painting slightly easier to interpret than the artefact, the stone axe-heads. They interpreted the writing, the petroglyphics, almost as easily as the cave-painting. T is is not surprising since both were full of suggestive details which stimulated a wide range of supposals. The diagram and the map, which were more abstract, were more difficult to interpret.

Fig 1 (iii) Graph showing means of scores for each type of evidence for all three groups, Unit 1.



(d) Discussion of Significant Interactions

The analysis of variance table (Table 7) shows that significant interactions occur for both AC ($F = 2.32$ df 8, 228 $p < .05$) and BC ($F = 3.85$ df 8, 456 $p < .05$). AC is the interaction between classes and types of evidence. A plot of the means (Fig 1 (iv)) shows that A_2 (exp. group 1) lacks parallelity with A_3 (exp. group 2) on evidence 1 and 2 (artefact and picture). The control group A_1 does not follow the general pattern overall.

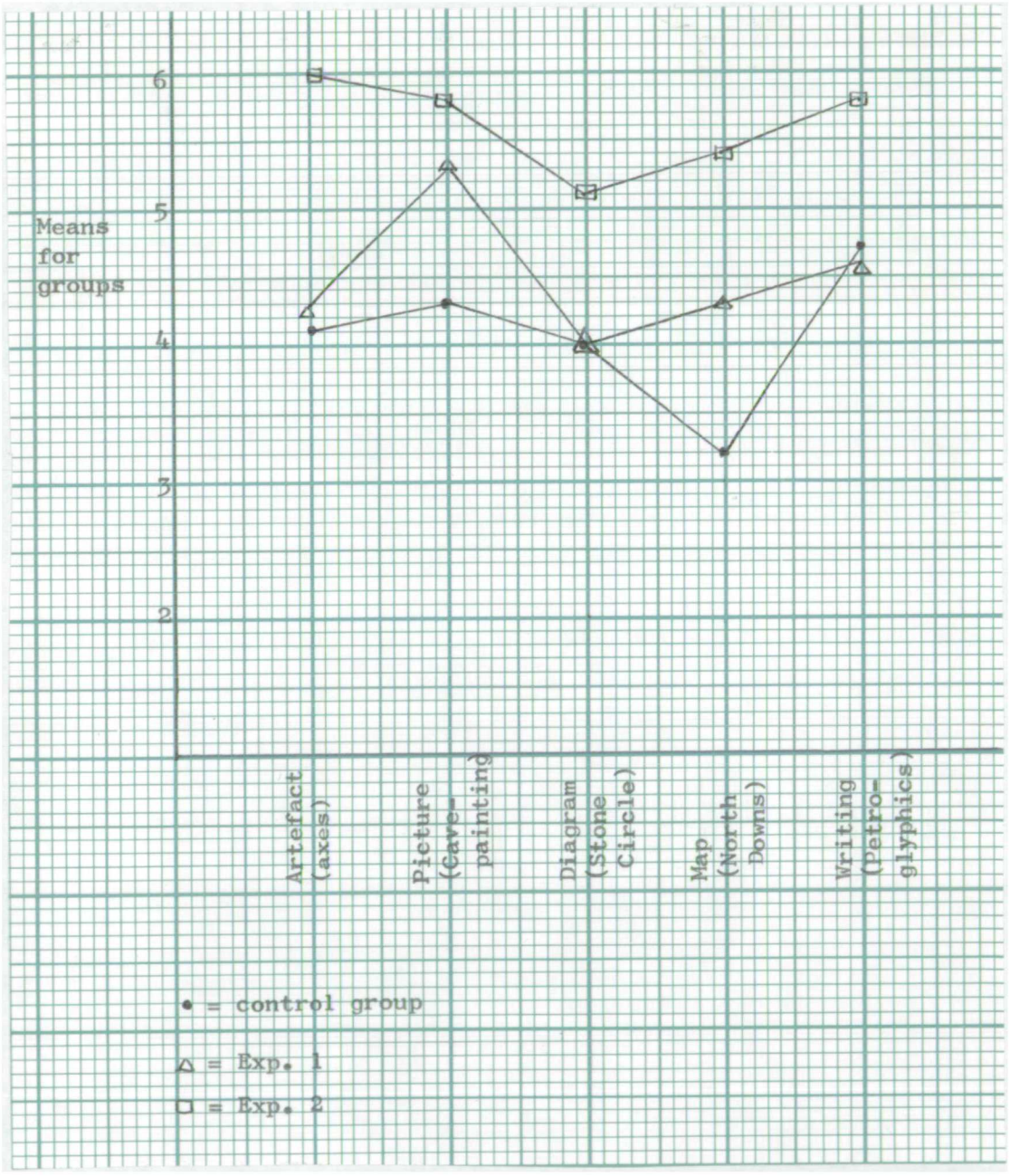
BC is the interaction between questions asked and types of evidence. The responses on B_2 and B_3 are fairly parallel, but with the given value of the sums of the squares and large degrees of freedom, a significant interaction is found. (Fig 1 (v)).

The significant interactions must be borne in mind in considering the main effects.

A x C

Main effect C showed that the children found the cave-painting and the petroglyphics slightly easier to interpret than the axe-heads, and found the diagram of the stone circle and the map more difficult. Nevertheless, interactions between the three groups and the types of evidence show that this trend is not quite the same for each group. The control group found the map more difficult than the diagram. This is not surprising, because both the experimental groups had visited Farthing Down and learned to relate the rock, vegetation and relief there to a map of the area, so they were more able to transfer this experience. Experimental group one found it considerably easier to interpret the cave-painting than the axe-heads. This may be because the group was not highly motivated and included five highly disturbed children with poor concentration; the painting would probably arrest their attention more easily than the axe-heads which require more application to interpret.

Fig. 1 (iv) Graph sh wing interactions between groups and types of evide ce for control and experimental groups, Unit 1.

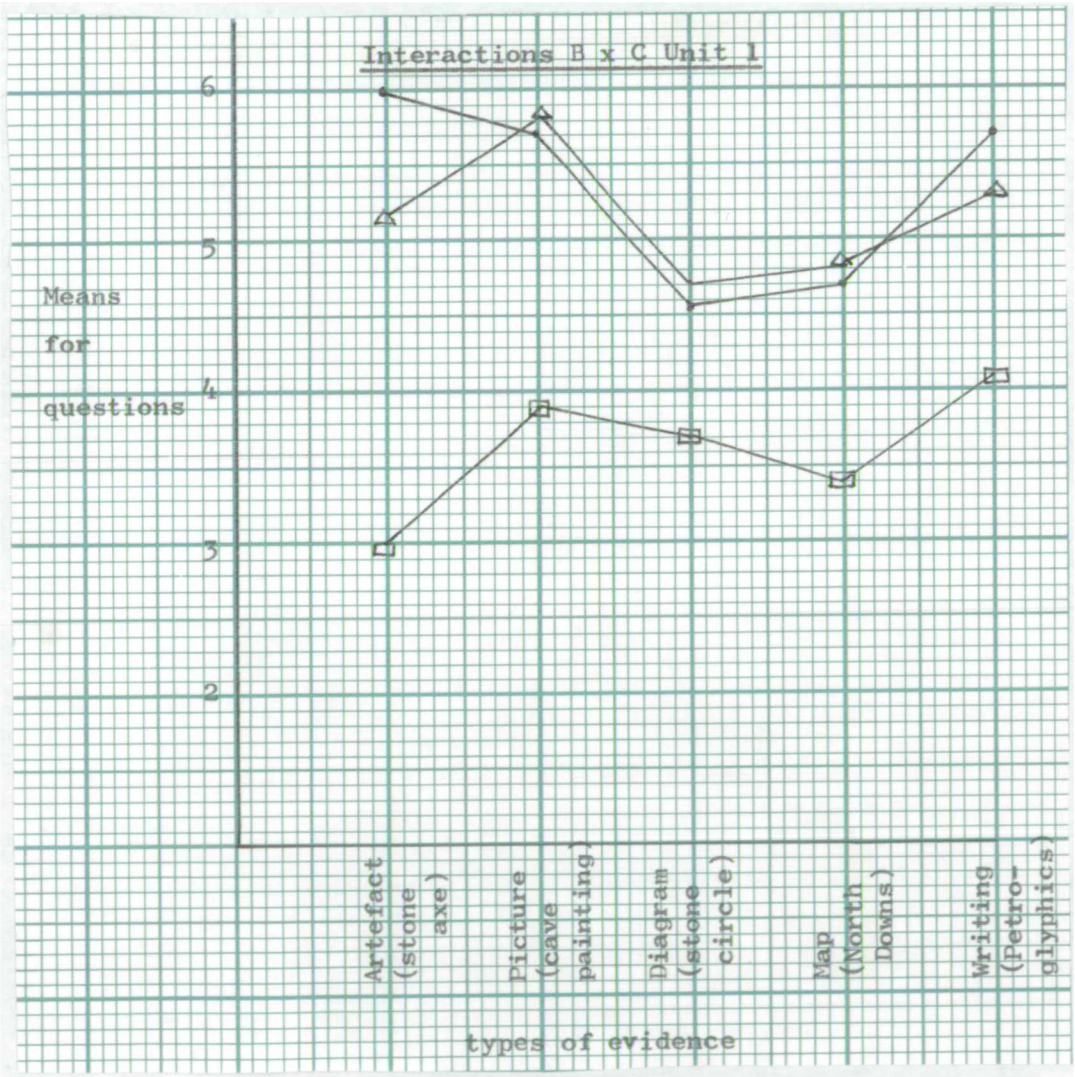


B x C

The graph (Fig. 1 (v)) shows that question three (what would you like to know?) is hardest, whatever the evidence. There is little difference in difficulty between knowing and guessing, about the cave-painting, the plan of the stone circle, or the map. This is not surprising because not very much is known about how these things were made, or used, or what they meant to Stone Age people, even by archaeologists, and for this reason there are fertile opportunities for reasonable guesses. On the other hand, it is not surprising that it is easiest to make certainty statements about stone axe-heads for several reasons. Archaeologists are able to make more certainty statements about how stone tools and weapons were made and used. They are central to a study of the Stone Ages and both control and experimental groups had lessons based on them. The experimental groups had three lessons on tools and weapons, and only one on circles, paintings and writing combined. The lesson plans for lessons 1 to 3 (appendix IX) show that far more certainty statements were expected in the discussions about tools and weapons than in the other lessons. The experimental groups had even been to Grimes Graves and seen a demonstration of how an axe-head was made and used. The children also found it easier to make certainty statements about the petroglyphics, than to guess how they were made and what they signified. This is probably because, although their precise meaning is unknown, it is evident that they were incised in stone, and it was possible to make general certainty statements about the purpose of signs to communicate messages, the need for shared understanding, and the rôle of language, because this is central in our own culture.

Although the graph of the means suggests that question one (what do you know for certain?) is easier to answer than question two (what can you guess?), there is no marked difference in the levels of response to the knowing and guessing questions. Even when there are interactions, these are only over less than one point, on a very sensitive 10 point scale. The t pe of evidence slightly influences the response to the questions. Question three (what would you like to know?) is more difficult for each kind of evidence.

Fig. 1 (v) Graph showing interactions between questions and types of evidence for control and experimental groups, Unit 1.



• = Qu. 1 - What do you know for certain?
△ = Qu. 2 - What reasonable guesses can you make?
□ = Qu. 3 - What would you like to know?

A(2) Concepts

Since language seems to be the key to the quality of children's thinking in making deductions about evidence, let us analyse the extent to which they used the concepts they had been taught when they answered the written and oral evidence tests. Lists of taught concepts are given in Appendix V. The bar charts (p. 137) record each time a child in the control group and in experiment 2 used one of the taught concepts (on one or more occasion) in a written evidence test. These bar charts make it clear the only concepts used more frequently by the control group than by the experimental group (painting, circle, cave, grave) were those actually given to the child as part of the evidence, or were common, every-day words (tools, food, pottery).

At the concrete level, the experimental group used a far wider range of concepts, more frequently, and at the abstract and superordinate level, they used most of the concepts taught in one or more instances, whereas (apart from one child using communicate) the control group used no abstract or superordinate concepts.

This use of abstract language would suggest one reason why the experimental group did better than the control group on the history tests.

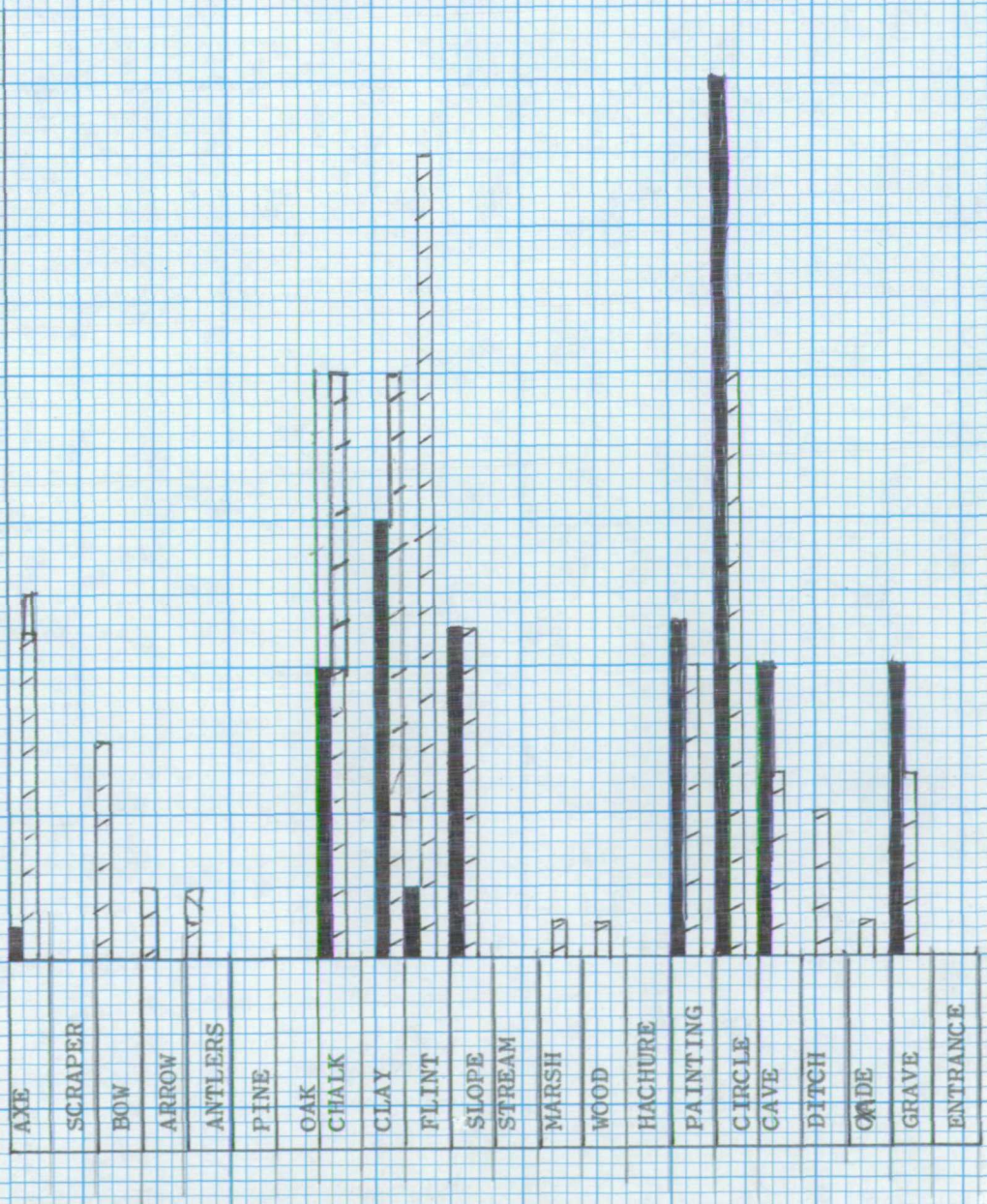
The concept charts (p.139) record the taught concepts used on one or more occasion in the led and unled group discussions of each piece of evidence. They show how many of the taught concepts were used in both led and unled discussions: far more were used in the discussions led by a teacher, where the aim was to encourage the children to lead from one argument onto a dependent argument, then to make generalisations.

Bar Chart 1.1

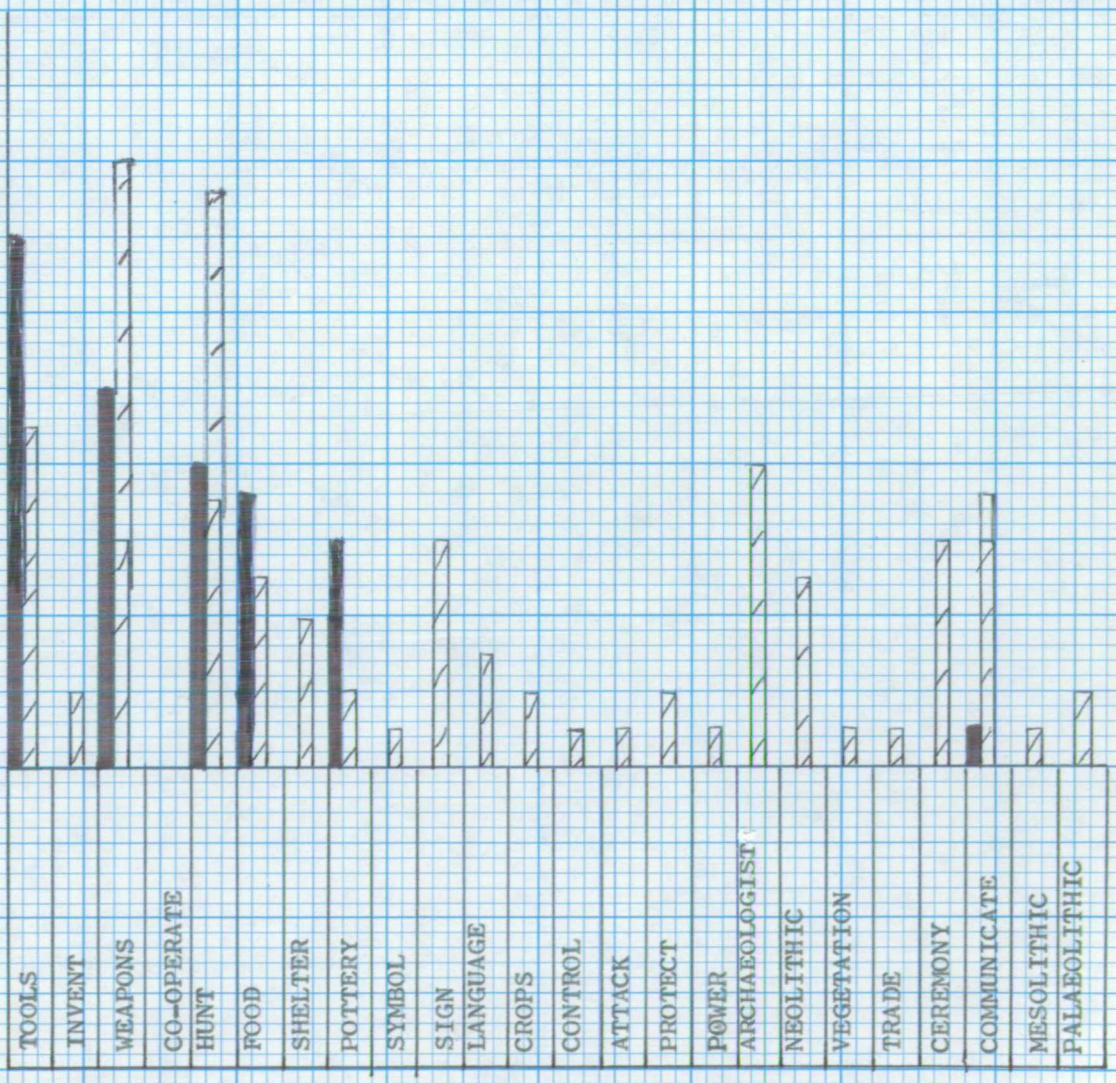
Bar chart showing taught concepts correctly used in written evidence tests 1 to 5, Unit 1, by experimental group 2 and Control group.

Control Group ▮ Experimental Group 2 ▯

½ cm. ▭ represents one child correctly writing this concept in a written evidence test.



Bar chart 1.1 continued



Bar Chart 1.2

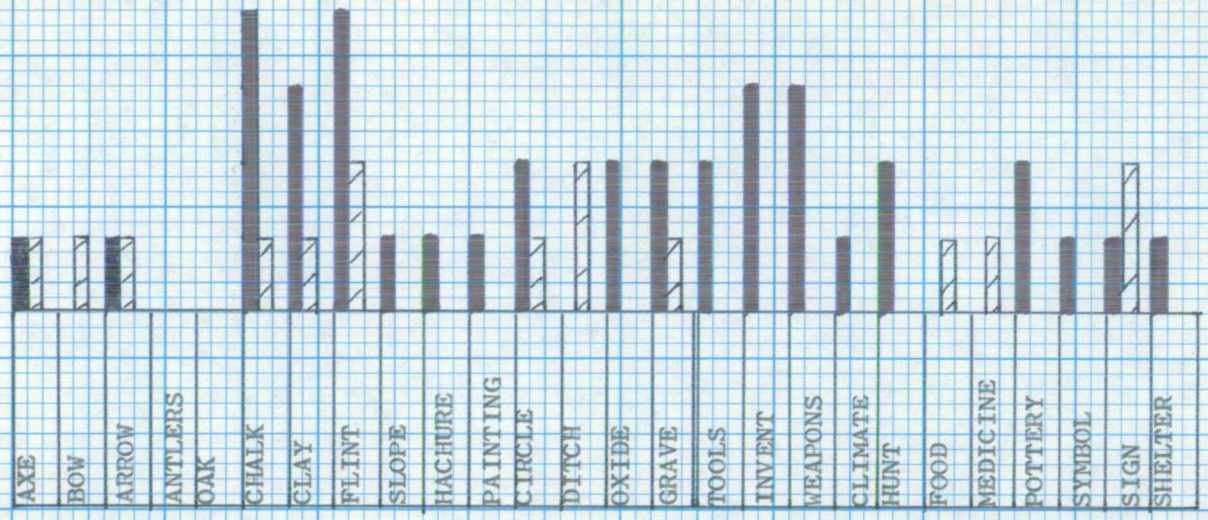
Bar chart showing taught concepts used in led and unled taped discussions

Each cm. represents the use of the concept in one evidence test, on one or more occasions.

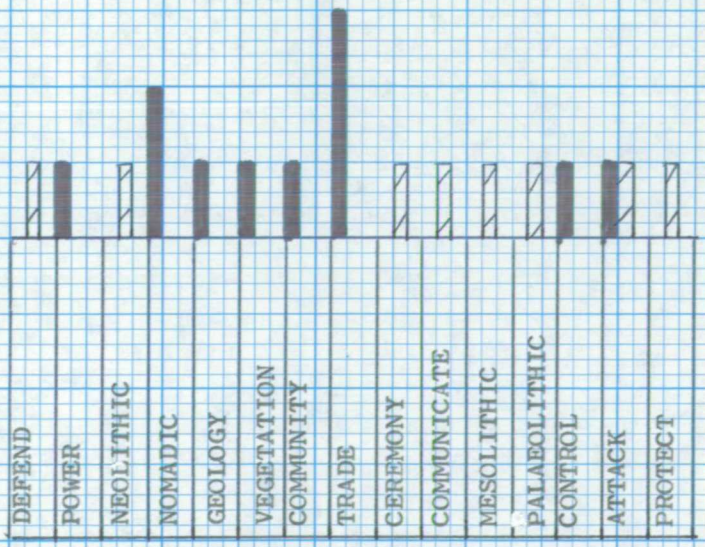
This chart shows that both led and unled groups used many of the taught concepts in one or more of the tests.

▮ represents led discussion groups ▨ represents unled discussion groups

The led groups used more of the taught concepts than the unled groups.



Taught concepts used by led and unled discussion groups



A(3) Analysis of Written Evidence Tests

In order to discover information about the quality and nature of responses not revealed in the score levels, I shall analyse each of the five written evidence tests in a different way. In discussing Test 1, Palaeolithic Hand Axes, I shall give examples of responses from each group, at each of the levels, to each of the three questions; this will give a flavour of the variety of answers, and show how the range of levels is valid across each group. For Test 2, a slide of a cave painting, I shall quote complete answers without alteration of spelling or punctuation, and including extraneous points, as they were placed on the answer paper, in order to show how it was often possible and necessary to look for the logical thinking behind a child's answer, in order to search for the highest level at which he could score. Donaldson (1978) and Povey (1980) pointed out how important it is for teachers to learn to look behind the surface of an answer to the logic a child is grappling with to apply to a problem, and which may be less clear than a 'pat' or learned answer, but reflect real problem-solving, and creative thought. Test 3, Diagram of a Stone Circle, will be analysed to compare the originality and variety of ideas in the experimental groups' answers with those of the control group, and show that a logical sequential statement may be received information and does not necessarily involve original deductions about the given evidence. This will show the effect of discussion not rooted in direct physical experience of evidence. In Test 4, Map of Area in North Downs, I shall develop this theme by tracing how the experimental groups applied the information they had learned through direct experience on their visit to Farthing Down to the new map, and compare this approach with that of the control group. For Test 5, petroglyphics, I shall show how teaching styles affect children at different ability levels in other ways. We can clearly see the teaching style of the control group, based on limited received information, from their answers, and how this does not prevent the brightest children

thinking for themselves, but it does limit the less able; however, in the experimental groups, even the least able produced original answers. (They make a range of valid suppositions about the evidence).

(i)

Test 1 Palaeolithic Hand Axes

Examples of responses from each of the three groups, at each level, for each question, show the range of levels and the variety of answers at each level.

Exp 1 and Exp 2 = Experimental Groups One and Two C = Control

Question 1: What do you KNOW FOR CERTAIN about this evidence?

Question 2: What can you GUESS about it? (As these answers show, there is not always a clear distinction between knowing and guessing).

Question 3: What would you LIKE to know about it?

1. EGOCENTRIC (illogical)

Qu. 1:	Exp 1	N.B.	They could have used them to wear
		A.M.	Their skulls weren't the same
	C	C.H.	They make tent. They can't go to the shops
Qu. 2:	Exp 2	K.G.	They played the hornpipe...they could have discos...if archaeologists found the pipe they would know they had discos.
	C		They can't havant the door because they....
Qu. 3:	Exp 1	A.M.	What were the children's games like?
		S.H.	How many types of wood did they have for their fires?
	Exp 2	K.G.	I would like to know why they look like monkeys, because they look horrible, archaeologists found some bones of them.
		J.F.	Where they got the mud or did they get it from under the grass because I did not see any mud in the slide. How long did the house stay up?
	C	P.C.	I would like to know why they didn't get colds like us.
		L.B.	I would like to know if the dinours ate cave men and if the dinours lived in caves.

2. DESCRIPTIVE I (attempt at logical deduction, inadequately expressed)

Qu. 1:	Exp 1	G.B.	Spit axe dagger
	Exp 2 and C		-
Qu. 2:	Exp 1	G.P.	If they used spears, we could know what animals they killed and if they used arrows they could of killed animals quicker.
	C	C.J.	I think sometimes it wasn't very nice for them and Stone Age got killed.
Qu. 3:	Exp 1	A.O.	I want to know how they did not cut their hands when they made the axe.
	Exp 2	P.C.	Why did they make shart axe heads when they made blunt axes?
	C	F.S.	If they were out hunting and a storm blew up where would they go?

---

3. DESCRIPTIVE II (repeating information given)

Qu. 1:	Exp 1 and 2		-
	C	D.H.	They have been carved to make tools
Qu. 2:	Exp 1	J.B.	I guess they were clever
	C	P.H.	They are sharp and they have been carved all around.
Qu. 3:	Exp 1	E.S.	Where in the world they got the flint
		N.B.	Where they were found
	C	C.J.	I would like to know how they found out how to make flint tools

---

4. PRIMITIVE ARGUMENT I (going beyond the information given)

Qu. 1:	Exp 2	They are rough, jagged, sharp, pointed. They are not smooth around the sides but they are in the middle. We know the palaeolithic carved the stones into sharp, rough, jagged....

	C	F.S.	The people were good craft makers because they made good tools.
Qu. 2:	Exp 1	R.L.	They had flint and the smaller the weapons the smaller the animal.
		R.D.	They made axes for different things.
	Exp 2		They got the stone and carved the skin off to make a house and they could get some moss and put the mud first and moss on the skin.
Qu. 3:	Fxp 1	R.L.	Did they have smaller weapons and bigger ones?
	Exp 2	J.B.	How did they learn how to make tools?
	C	R.H.	How did they eat when they didn't know how to make weapons?
		T.B.	I would like to know how they could catch the animals without them looking.

---

5. PRIMITIVE ARGUMENT II (Two statements going beyond the information given)

Qu. 1:	Exp 1	D.S.	I know that they use flint for tools and to kill animals.
	Exp 2	L.W.	They could have been used for chipping flint out of a mine or as chipping wood out of trees.
	C	G.R.	They are Stone Age weapons. They were made by hand.
Qu. 2:	Exp 1	N.H.	They could make things and fight.
	Fxp 2	K.B.	They made tools out of flint. Flint is sharp and you can kill with it.
	C	M.B.	It was hard work. They had to find the right stone.
Qu. 3:	Exp 1	I.W.	What did they do with these tools, and how deep down did they find the flint?
	Exp 2	M.F.	How they hunted and how they made them.
	C	B.P.	I would like to know how they cured the stone age men when the animals hurt them, and how cavemen learned to hunt animals.

6. INCIPIENT GENUINE ARGUMENT (attempt to use therefore or because, but causal connection inadequately expressed).

Qu. 1: Exp 1 They used hand axes and they sharpened things. Therefore they found flint and dug for it.

Exp 2 N.T. We know they made axes to chop down trees for fire from this, and they used flint. Therefore they used the flint for fire to keep warm under the trees.

C T.B. The artefacts must have been hard to make. Therefore the cavemen must have worked hard to find the right stones.

Qu. 2: Exp 1 C.J. They chopped down trees and made things with their tools. Therefore they used wood and stone.

Exp 2 K.C. They had different sorts of flint. Therefore they lived in different places.

C B.P. The stones Stone Age man finds do not have to be perfect. Therefore the cavemen had to use their skill to carve the stones.

Qu. 3: Exp 2 M.H. I would like to know who invented it because if he/she invented it and lots of other things and nobody else did he might be the only person who was allowed to invent.

C C.S. Where did the animals hide, because they'd get killed if they did not hide?

---

7. GENUINE ARGUMENT I (correct use of therefore and because)

Qu. 1: Exp 1 J.W. There are two kinds of flint; some are hard and some are soft. Therefore they made shapes using hard bits of flint to break off the soft bits.

N.H. They're intelligent people. Therefore they thought and worked.

Qu. 2: Exp 1 B.K. They used them for killing animals therefore they might have used the skin for beds and to cover their wifes babies.

E.S. They must cut down trees with tools. Therefore they used wood.

Exp 2 F.B. It took a long time to make them. They needed a lot of flint to make them. Therefore they must have had to be very patient.

Qu. 3: Exp 2 F.B. Did they make a lot of axes, and did these axes always work, because then I would know if they made a flint axe every day, or if they sharpened them.

---

8. GENUINE ARGUMENT II (two arguments, each using therefore or because correctly).

Qu. 1 Exp 1 J.B. They had hand axes. Therefore they chopped wood and they made things.

M.B. They found flint in the ground. They made hand axes. Therefore they used them for killing animals and therefore they ate meat.

Exp 2 K.G. They made flint spears. Therefore they went hunting and they made flint axes. Therefore they went for wood.

C C.C. They had weapons of stone. Therefore they killed something. They had tools; therefore they scraped something.

Qu. 2 Exp 2 D.F. They must have used antlers to make the shapes of the flint, because of the dents. Therefore they must have known the season the deers dropped their antlers, and therefore the sun must have been a clock for the Stone Age people.

A.W. They might have had different flint for different animals. Therefore they might have had sharper

ones for smaller animals. And they might have had different flints from different places. Therefore some might have been harder to get to.

C N.C. They ate what they killed. Therefore at first they didn't cook food, and they might have cooked it later. The men did the hunting. Therefore the boys had to learn to hunt.

Qu. 3 Exp 2 I would like to know if they are spear heads or axe heads, because it could tell you if they are from palaeolithic or mesolithic times, and I would like to know where they got the flint from because then you could tell if they had a flint shaft.

---

9. INTEGRATIVE THOUGHT I (two arguments using therefore or because correctly followed by a synthesising statement).

Qu. 1 Exp 1 I.W. It is made out of flint. Therefore the stone is very hard. They were made in the Stone Age. Therefore they must have been clever and remembered things. Therefore they have made tools to help them to do things.

Exp 2 M.F. Flint was chipped. Therefore they knew how to make arrows and spearheads. And they are different sizes. Therefore they know which size was needed for different weapons. Therefore they were not primative.

P.C. They had good skills to chip flint. Therefore they could make weapons. They could make tools. Therefore they could carve things. Therefore they took great care in their specialised work.

C N.N. They were all used for different things. Therefore

the cavemen made different shapes and sizes out of stone. They were useful to kill animals. Therefore they must be very sharp: the Stone Age men were good at killing animals and making things out of stone.

Qu. 2 Exp 2 M.H. It could be a hand axe. Therefore they could decorate things. The black one could be the chief's wife's. Therefore they had decorative (ornamental) tools. They have begun to take pleasure in themselves.

Qu. 3 -

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10. INTEGRATIVE THOUGHT II (as above, using a superordinate concept in the synthesising statement).

There were no responses to Unit 1, Test 1 at this level.

(ii)

Test 2 Cave Painting

Examples showing how it was sometimes necessary to look for the underlying logic of the thinking processes behind an answer in order to assess the level of thinking.

Ex 1 A Highly Assessed Score in spite of barely decipherable spelling and writing:

R.L. (exp 1, qu. 1, NVR 107) found spelling and hand-writing painfully difficult, yet this answer was assessed at level 8:

At buflog were a live and whole of food	They must of huntid for them for food	
They must of had hoong (harpoons?) for weapons	Thay huntid and were cuning	

He is saying "I know for certain buffalo were alive and a source of food...they must have hunted them. And they must have made weapons...they were cunning." He has formed two arguments based on two premises, which were both derived from the given evidence.

Ex 2 The Highest Scoring statement in an answer is assessed, and lower level aspects ignored:

N.L. (C. Qu. 1, NVR 104)

They didn't have any pictures. That's why they drew on 'alls	It made the home look comfortable and cosy.	The drawings they don was did by chalk

This answer was scored at level 3. It may at first appear to be illogical, anachronistic and incorrect; or it may seem to cover each section of the answer sheet and deserve a higher score. But it contains within it one correct 'matter-of-fact' deduction based on the evidence - "they drew on walls" which qualified it for a level 3 assessment.

Ex 3 In order to score above level 2, answers must be deduced from the given evidence:

T.W. (Qu. 1 C. NVR 107)

skins were used for clothes and beds. Spears and stones	Stone Age was frightened of the big mamoth	
were used for killing animals	They used their hands to cook by rubbing a stick	

This answer was assessed at level 2 (-incipient logic not clearly expressed). The points she makes are suggested by the cave painting, but really she is simply 'writing all she knows about'....in '1066 and All That' fashion, with no specific reference to the evidence.

Ex 4 The Divisions on the answer paper aim to encourage two sequential arguments and a conclusion, but sometimes the child's answer does not correspond to this mould and it is necessary to look for this logical pattern on which it is based.

(a) F.S. (Qu. 1 C. NVR 113)

They were good artists and clever. They drew	So they could catch a good	They would believe things if they drew it.
things on the walls for good luck	meal	

This is assessed at level 6 (incipient genuine argument). She makes two statements: 'They were good artists', and 'they drew things on the wall', and she is attempting to articulate the idea that painting a successful hunt might give them the power they wanted over the animals.

(b) This answer scores at level 6 for the same reason.

S.H. (Qu. 2 Exp 1 NVR 104)

I guess they kept their oxides in pots.	I guess they painted on more than one wall	I have guessed that they painted with their hands and kept their oxides in pots.
I wonder if they used their hands to paint		

He makes two valid guesses, and develops the first to imply that if they kept their oxides in pots they stored them and used them in large

quantities, so there would be other paintings besides this one. But he does not clearly explain this argument. His conclusion only rotates the first two points, and so is ignored.

(c) The following answer also scores at level 6. Here, the two statements under 'because' are disregarded because they are simply affective, and do not develop the first statements; but the statement under 'conclusion' explains why he wants to know if there was someone to teach them how to do cave paintings. Although it is not clearly expressed, he wants to investigate how they co-operated and transferred skills.

T.M. (Qu. 3, Exp 1 NVR)

I would like to know if there was someone to teach them to hunt.	because I would like someone to teach me to hunt.	They must have helped each other to do cave paintings.
I would like to know if there was someone to teach them to do cave paintings.	I would like to know how they were such good painters	

In spite of the layout of the answer paper, which reflected the assessment levels, it was often necessary to analyse an answer carefully to see which level is represented. It was necessary to look behind poor spelling and writing to look for the parts of an answer which reflected the highest level of response and ignore other aspects; to decide how the deductions were made by referring to the evidence; and to ignore the placing of the statements on the answer sheet. This section highlights the difficulties which arise in evaluating children's answers, but, applied consistently, the measure of assessment is reliable.

Test 3 Diagram of a Stone Circle

Examples will show how teaching methods based on discussion of evidence produce a rich variety of answers in the experimental groups, even when this is not related to direct physical experience (They did not visit a stone circle).

The experimental groups had ideas about the purposes of the circle - probably connected with beliefs, ceremonies, or processions. In Exp 1, K.M. "reconed it was for war dances, trading flint and praying", and A.M. thought it was "to communicate by telling the time." Some children speculated how it was built. M.L. and D.S. suggested it was by digging holes and using pulleys, or "a bag with string on to pull it up." J.W. suggested that the stones were probably found "in a stream or a river" and were pulled up by using "skins tied together."

Exp 2 were equally good at making a variety of deductions from the evidence. Here are two examples:

M.F. (Qu. 1 Exp 2 NVR 129)

They knew what a circle looks like	They could build a circle	They were not primative
They could get the stones there	They knew how to get them there	

M.H. (Qu. 1 Exp 2 NVR 135)

They had two kinds of stones	Therefore they must have gone to different places to find different stones	They are choosing certain things
They had another shape in maths.		

The Control group, on the other hand, seem to have been told two things about the diagram, and this information dominated their answers. They had been told that the S/W bank was a protection against the predominant wind and rain, and that the Druids' sacred plant was the mistletoe and this grows on oak.

Nine children, including L.M. (NVR 136) said the bank must have been facing S. West because the wind and rain come from the S. West. One child also talked about Druids, magic oak trees, 'wite kloks' and 'skare majk.' There were eight similar responses.

This example is typical:

D.H. (C. Qu. 1 NVR 106)

The Druids felt that the oak was a special tree because mistletoe grew on it.	They felt they cad do micak and they breat a circle made it for saying prayers	

This answer scored at level 3 because it was given as 'knowing for certain' but many similar answers given as guesses had to be given scores which reflected logical thinking even when the ideas were clearly received information.

The evidence scores then do not reveal the difference in quality and originality of thinking, in the control and experimental groups. The categorisation of levels used does not in itself allow differentiation in terms of the origins of pupils' ideas, only in the kinds of thinking involved. The control group's responses, therefore, have to be accepted on this basis. However, the levels do not reveal differences between the control and experimental groups in the variety and range of subjects' thinking.

Test 4 Map of a part of the North Downs

I shall first give examples of how both experimental groups applied the knowledge they gained on the visit to Farthing Down, to interpret the map. The points they were taught are given on the left, and examples of how they used them on the right.

These examples suggest that, while the last test showed that discussion of evidence teaches children to reason for themselves, they do so even more effectively if they have more direct experience of the problems posed by the evidence.

Examples of Written Answers, showing how visit to Farthing Down Helped Children to Interpret the Map (Exp. 1)

Evidence Discussed on Visit to Farthing Down	Children's use of this evidence applied to the test map. (Exp. Group A). Written Evidence
Geology: Top of Down is chalk with flints. Sparse vegetation and well-drained.	C.L. Qu. 1. They had a lot of chalk. They could build huts on it because it's flat. They would not build a hut at the bottom of the hill because the water would not run away. (Score level 8). A.M. Qu. 2. They could have camped on the slopes because when it rained the rain would run down the slope. If people lived on a slope, their camp would not be flooded and their huts would not get destroyed. (Score level 7).

C.L. Qu. 3. I would like to know what flint implements were used for because they already had hand tools for killing animals.(level 6).

clay soil - sticky - heavy

H.C. It has got a lot of clay on the surfis...it must of been soggy. It must of been very wet. (Score level 7).

I.W. Qu. 2 I can guess that they made things...they would use clay to built pots. We can also guess that there is chalk... there is flint (Score level 8).

H.C. Qu. 2. There might have been a lot of wetness...it could of been cold. There might of been stone age people living there...they might of been living on the chalk bits.

In valley bottom there is marsh and a stream.

M.L. Qu. 2. They might have routes to the rivers...they would have an easy way to go. They used pots to get water...they can get water in time. (Score level 8).

hachures show slopes

K.M. Qu. 1. We know that Hachures mean steep slopes...the hachures on the map mean there are shallow and steep slopes. (Score level 7).

Vegetation (+ Geology)

grass on top

yew and oak on clay slopes

J.W. Qu. 2. I can guess what kind of trees grew there...I think oak and fir trees grew there. There were big chalk and clay areas where they could make pots.. they could of lived near the clay area so they wouldn't have to walk far. (Score level 8).

	C.L. Qu. 2. We can guess which plants they used for medicine...some people knew which plants cure illnesses. We can also guess which plants and leaves they used for a bed...they would choose the best things to make it. So they would select things to use. (Score level 7).
Animals	E.S. Qu. 3. I would like to know if animals lived there when Stone Age lived because I want to see if they ate small animals.

Examples. Experimental Group 2. Unit 1. Test 4. Showing use of Visit in Interpreting Map.

Geology: chalk/flint clay slope, wind, river	P.C. (level 8) Qu. 1. They found that chalk sucks the water through it... we know it was dry. They lived in places like Farthing Down. D.F. (level 9) Qu. 2. They lived near to chalk and clay areas...they didn't have to go far to get flints. They lived near slopes...they were in a place with not many trees. They knew exactly where to live. J.G. (level 8) Qu. 2. I guess they could have shelter from the cliffs...they would be safe. They would have water... they could have land for farming on the chalk soil. F.B. (level 8) Qu. 2. They probably went fishing in the river...they probably had quite a lot of fish. They probably had to wash in the river...they probably didn't wash much!

Vegetation ↓ Animals	J.G. (level 8) Qu. 1. Neolithic people must have been in the area...they had camps there. Trees might be in great numbers on the clay soil...they had shelter. M.F. (level 7) Qu. 3. Why they chose that place. What animals lived there, because I'd like to know what they ate. R.F. (level 7) Qu. 2. I can guess there must have been a lot of woods...I can guess there must have been lots of animals nearby. I know there must have been a lot of food nearby.

The scores were surprisingly high for such abstract evidence; this seems to be because the visit enabled the children to relate real experiences and images to it. As A.W. wrote in his conclusion 'This is the best evidence game' !

It is also interesting that M.H., who comes from Madras, applied his own cultural experiences to the map, recognising the importance of water vividly and directly:

> "(level 6) Qu. 3. Could they measure water, because if they did, maybe they had a limit. In which way did they use the water, because they could say it was a luxury."

Examples of Control Group's Answers to Test 4. (The Map)

These answers show how the control group try to apply existing knowledge ~~of~~ to the map which is not directly relevant, because they have not had firsthand experience of a similar location. This often leads to irrelevant statements, which are not deduced from the information given.

Stone Circles and Caves:

(level 1) L.B. Qu. 1. They think they are magic...they made stone circles.

Qu. 3. Were the hills special made by the Druids because they look like the roots of a tree?

(level 3 because of other information in answer). M.B. Qu. 1. The caveman would camp here as much as they can...they can make pictures on their walls.

(level 1) T.B. Qu. 1. The circle may of been a long way from the cave. The caveman must of brought their animals to the circle...

Physiological Development and Progress:

(level 1) P.C. Qu. 2. The way the Stone Age changed may be because the way the Stone Age started building things. The Old Stone Age didn't have huts...they got bigger brains. They got cleverer...

'The Men', 'Women', 'Children' and 'Hard Times'

(level 1) K.D. Qu. 3. Today women travel and send our parcels by motor car, train, ship or plane. Early man had to walk...

They talk about "the men" and "the children".

(level 4) T.W. Qu. 2. I think Stone Age men were the only ones who

went hunting. I think the men did the scraping skins off the animals. I also think the children did the cooking.

(level 4) C.S. Qu. 3. Did they find sand under the rivers and did the children play in it?

(level 5) N.L. Qu. 3. I guess they had kind of huts to live in. It must have been horrible. The weather was sometimes bad. The men had a very hard job.

Chalk and Flint:

The control group, who did not know the significance of chalk for flint, often assume it was for drawing.

(level 4) F.S. Qu. 2. Chalk was used to paint with. People knew how to make fire.

(level 3) Qu. 3. I would like to know about chalk.

There are also anachronisms

(level 1) T.W. Qu. 2. I guess they used to go to Tatsfield, Titsey, Brasted, Knockholt and Westerham.

(level 3) K.F.W. Qu. 2. (extract) This picture must be a sort of map. If they looked on this map, they would know where to get the clay and chalk. So that's how we first got maps....

Test 5. Petroglyphics

In discussing responses to this evidence test, I shall show that although most of the control group answers again reflected generalised received information, the most able children were still able to think originally and creatively about the evidence. On the other hand, discursive teaching in the experimental groups enabled even the least able to make original deductions.

The Control Group

The control group's ideas, in this test, revolved around smoke signals, sex stereotypes, and physical appearance. They also reflected an unsympathetic view of faces different from their own and there were frequent anachronisms.

D.H. (C. Qu. 3. NVR 106) level 5 "They could of used smoke signs. They could use it to tell stories."

L.B. (C. Qu. 3. NVR 119) level 2 "How do the archaeologists know the Druids builded the stone circles? They may have used smoke to contact friends."

F.S. (C. Qu. 2. NVR 113) level 7 "One of the pictures looks like a smoke signal...they used smoke signals as well to contact people."

A typical sex-stereotype answer, quite unrelated to the evidence, and so scoring at level 1, was given by

T.W. (C. Qu. 2. NVR 107) "I think the boy children went hunting because they would be strong. I think the girl children helped to cook...I think girls should be able to cook. Both boys and girls were clever."
(T.W. is a girl!)

N.L. and J.C. also score at level 1 for their irrelevant remarks about physical appearance:

N.L. (C. Qu. 3. NVR 104) "They probably look funny?"

J.C. (C. Qu. 3. NVR 107) "Do they look ugly?"

Anachronisms include:

J.C. (C. Qu. 2. NVR 107) "Did they have glasses to read it?"

and

S.J. (C. Qu. 2. NVR 93) "A picture of a dinosaur would probably mean a dinosaur."

The Experimental Groups

The experimental groups, on the other hand, often discussed the relationship of spoken and written language; they referred to symbols, and discussed, in a simple way, how they originated.

E.S. (Exp 1. Qu. 1. NVR 129) level 8 "I know that Stone Age men had language. they could write, and they could talk to each other."

G.P. (Exp. 1. Qu. 1. NVR 133) level 7 "They wrote strange writing...they had different words from today. This writing is found in Italy...it could have been found in other places."

C.L. (Exp. 1. Qu. 2. NVR 86) level 6 "We can guess that they did not argue about what the signs mean...we know ther was a head-man. We can guess sometimes whether they made them up or not...they must have been sensible about their signs. They must have chosed a sensible man for the head man or they would all go wrong."

And in Experimental Group 2:

A.W. (Exp 2. Qu. 1. NVR 128) level 9 "They communicated...they made signs for communicating. They drew...they had things to draw with. They needed other people."

and

D.F. (Exp. 2. Qu. 1. NVR 120) level 9 "They had their own Stone Age language which meant they had to teach each other how to speak. They could write... they had to co-operate in making this writing. They had to co-operate and teach each other."

However, children in the control group with high NVR scores sometimes achieve both high levels of deductive reasoning and good ideas.

C.J. (C. Qu. 2. NVR 133) level 9 said "They may have had a special code in each family...all the messages may not have been the same. Some of the drawings may have been to people who died...they may have believed in the spirit of the dead person. They must have had to teach the children to read and write."

and

L.M. (C. Qu. 2. NVR 136) level 8 said "I guess that in different countries they had different signs...if someone went to a different country, he would not understand. It took a long time to carve the signs...they would not move from place to place."

In the experimental groups, children with average NVR scores seem more likely to achieve high levels of deductive reasoning. These examples seem to be due to concepts which have been introduced (e.g. communicate, co-operate). Here is R.L. (Exp. 1. Qu. 1. NVR 107)

level 9 "They could write...they communicated. The Stone Age people used the writing to tell stories...they must have had adventures. If they could

write they must have been ~~closer~~ clever at communicating to get their ideas around."

and

J.H. (Exp 2. Qu. 1. NVR 100) level 8 "They could write...they had language. They could communicate...they could co-operate. They were clever."

Throughout the experimental groups' answers, there is the constant theme that "They were not primitive", "they were intelligent" or "clever", which contrasts with the control group's underlying feeling that "it must have been terrible", "they were funny", "they were ugly" and "they believed in magic."

Analysis of the five written evidence tests, then, shows that children in each group respond across the range of levels; that assessing their level of response often involves careful scrutiny of the thinking processes on which the answer is based; the levels of reasoning do not always reflect the originality and variety of answers found in the experimental groups compared with the more stereotyped responses of the control group; this seems a result of discursive teaching methods based on selected evidence, but it is even more apparent when the discussion is related to direct experience, as in the visit to a 'Stone Age site'. And, finally, although very intelligent children are not prevented by 'received didactic teaching' from thinking creatively, less bright children only do so when teaching methods have taught them how to.

A4 Analysis of Oral Evidence Tests

In both experimental classes, groups of about six children discussed each piece of evidence used in the written tests. Their discussions were recorded. In Experimental Group 1, the discussions were led by a teacher; in Experimental Group 2, no teacher was present.

First, the general content of the led and unled discussions will be compared; then the pattern of development of arguments in each will be discussed, and, thirdly, children's written answers will be compared with their contributions to the discussion of the same piece of evidence. Finally, turn-taking in led and unled groups will be discussed.

Synopses of tapes are given in the Appendices (LI-LIV). Columns 1 - 10 represent the 10 marking levels, and the layout shows how statements may be made at level 3 or 4, then sequential arguments developed from them, often by others in the group, so extending the level of the argument.

(i) A Comparison of the Content of the Led and Unled Discussions

As the flow charts show, there was real argument and problem-solving debate in both the led and unled discussions. The content was similar for both groups; in discussing the artefact, picture and diagram, they both considered how things were made, and what their purpose was. Both groups discussed the physical characteristics on the map, and their implications, and the meanings of the petroglyphics.

There were three main differences between the led and unled groups. Firstly, in the unled groups there were more interjections and more raising of points already made, while the led group discussion tended to revolve around a point until it was exhausted, then move on. Secondly, although there was genuine discussion in the unled groups, it tended to be about physical characteristics: they discussed what the

axes were made of, which were sharp or smooth, whether the cave animals had humps, or teeth, or necks. When they discuss the hand axes, the 'arrow' has wings 'like an aeroplane' - 'like an arrow', 'like a hang glider'. They say they 'really like this one' because 'it's smoothed off nicely'.

When they try to explain an unfinished animal in the cave painting, they say "it could be a 'god' underneath and one tribe killed another tribe then drew their own 'god' on top."

They say 'maybe the painting is to remember something, like when the animal smashed up their homes'. Table (i) in the analysis of Unit Four shows that in Unit One the led group made twenty-two synthesizing statements at level 9/10, whereas the unled group only made two. Although the unled group improve, the led group continue to make more level 9/10 statements than the unled group. The led groups used more abstract concepts and made more general statements.

Thirdly, although both groups discussed the purpose of evidence, the unled groups always did this very vividly by telling highly imaginative stories to explain their idea. In the diagram of the stone circle, for example, J.H. says, "It could be a castle"; M.E., "A fortress they could put wood across it and seal it." J.H., "Wooden doors - gates, say." M.F., "A wooden gang plank." And R.L. adds a final touch, "and there are two entrances. One could be a trick one!"

Then they imagine other stories:
M.F., "Maybe there were two brave warriors and they killed the first people ever to invade..." K.C., "So they'd be remembered for ever." M.F., "Or maybe they stole treasure from another tribe, and buried it, and built the wall around it..."

Both groups, then, achieved genuine discussion, and selected the salient points to discuss, but in doing so, the led groups made more general abstract points, while the unled groups concentrated more on concrete characteristics, and vivid imaginative story telling. The led groups achieved a more comprehensive discussion, but lacked the vitality of the unled groups. The unled groups also found tests 4 and 5 more difficult than the other evidence to discuss; this was less true of the led groups.

Diagram 1(a)

(i) A Comparison of the Content in Led and Unled Discussion

Experiment 1. Led Discussion	Experiment 2. Unled Discussion
Test 1. Artefact: Palaeolithic Hand Axes	
Tools → Specialisation → Transferable skills; Tools → Sources of flint → trade/travel	Physical Description → sizes large/small; material wood/stone; smooth/rough; blunt/sharp; purpose: arrows/axes
Test 2. Picture: Cave Painting	
How it was done → skills involved; tools and materials	Much discussion of physical characteristics of animals → Purpose explained in story form → Hunting; Animal Gods; Tribal sign; Competition to choose a chief
Subject → animals seen; hunting methods/weapons; purpose → power over animals; lure; tribal sectect/ ritual	
Test 3. Diagram: 'Druids Circle' Caernarvon	
How made → Ditch; Transported stones; raised stones	Describe information given → Discuss date, from pottery evidence.
skills → community; co-operate; geometry	How ditch and stones made
Purpose → meetings; parades; market; kill animals; prayer/magic/ritual; time seasons	Purpose → in form of vivid stories; commemorate brave chief; description of circle being attacked; buried treasure of rival tribes

Experiment 1. Led Discussion	Experiment 2. Unled Discussion
Test 4. Map of Area of North Downs	
Physical Character given:	Physical character given:
flint, clay, water, trees, grass, plants, hills	river, chalk, flint, hills, plants
Uses of each of these, based on visit	Attempts to project selves into scene and imagine what it is like - vivid in places
Discuss possible site of settlement	(But unled group found less to say than Exp 2 groups on tests 1 - 3 and less than Exp 1).
Test 5. Writing: Petroglyphics	
Skills: talk, communicate, share ideas, co-operate, use symbols	Discuss meaning of each individual symbol separately.
Purpose: Meaning of individual signs	
warning, ceremony, message, story	
Relationship of this symbolic code to cave painting.	

(ii) Comparison of the Structures of Arguments in Led and Unled Discussions

Having seen that both groups went beyond describing the evidence, to make deductions about the society that produced it, and how and why they did so, we shall compare the structure of arguments in led and unled discussions. The diagrams show the sequence of arguments, based on the levels defined in Chapter Two : 1 - 2 denotes an illogical or scarcely logical statement; 3 - 4 a logical statement based on the evidence; 7 - 8 a second statement made by another child based on a level 3 - 4 statement, and 9 - 10 a synthesizing generalisation based on preceding deductions. Appendix XXXVIII shows how a discussion is assessed and recorded in diagramatic form.

The teaching strategy for Experimental Groups 1 and 2 aimed to teach them to make deductions from evidence, and use abstract vocabulary; these diagrams show that both the led and unled groups were able to develop sequential arguments, by making points (level 3-4) which were developed by other children (at level 7-8), and were sometimes followed through to level 9-10.

Sequencing Arguments

Here are some examples of the sequences of statements, which the diagrams on pages 173-174 illustrate. Exp. 1. Test 3 are discussing the trackway marked on the diagram:

3-4	7-8	9-10
Ga. The trackway goes on past the entrance	J. Perhaps it was the trackway for the tribe	Ga. That shows they could co-operate
N. Perhaps they brought stones along the trackway		J. Yes, there was a community

The next example from Exp. 2, discussing the petroglyphics, shows how a 'concrete level' statement can be developed into a more abstract one:

S.W. (NVR 102) "This sign looks like a caterpillar crawling up a stick."

J.K. (NVR 88) "Or it could mean growth, or something like that."

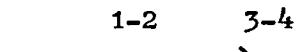
Illogical Statements

Illogical statements (level 1-2) were made by both groups, and it is

interesting that in the unled groups they were either ignored, or their illogicality explained by another child, who led on from here to develop a logical statement, and put the discussion back on a firm footing - always surprisingly tactfully.

For example, here Exp. 2 are discussing the date given beneath the diagram, telling when the stone circle was excavated (1975).

1-2	3-4
J.H. (NVR 100) It was found, say, 94 years ago	R.L. "1975" K.C. Well, work out how many years ago then. M.F. 11 years ago

(This exchange is recorded in the diagram as 

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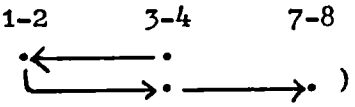
Here again an Exp. 2 group block an illogical statement by one member, and prevent the group going off at a tangent.

1-2	3-4	7-8
Chalk turns into paint	There must be a lot of chalk there on the hill They used oxides for paints	They could look down on all the animals from the hill

(This is recorded as 

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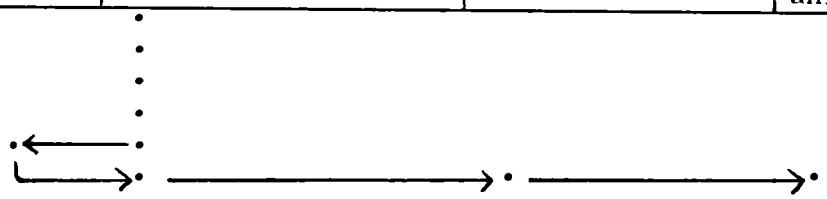
Synthesizing Statements

The led and unled discussions then were not dissimilar in the structure of their arguments, but they differed in three ways. Firstly, the unled groups were less likely to make generalised synthesizing statements (level 9-10). The unled groups made only three generalisations of this kind: after discussing various stories that may explain the stone circle, M.F. said "It may be to commemorate a special event." Discussing the map

and the likelihood of finding wood and berries, they concluded "It would be a good place to live." And the group discussing petroglyphics enumerated possible meanings of the symbols - representing gods, a feast, a dead chieftain - then M.H. (NVR 108) said, "It may be a sign for a ceremony."

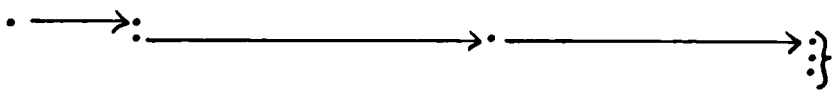
On the other hand, as the diagrams show, there are many instances of the led groups following statements through from level 3-4 to 7-8, then reaching 9-10 (sometimes rejecting an illogical contribution on the way!). I shall give two examples. Here, they are discussing the palaeolithic hand axes:

1-2	3-4	7-8	9-10
Or anywhere if you dig deep enough	They may have been found at Grimes Graves. Or chalk areas like the white cliffs of Dover. Or on a chalk and flint hill in Kent. Or in our bird sanctuary They may have got the flints from an uprooted beech or by digging for it	They either lived in the place where they found it, or travelled through and dropped it	They might have been nomadic - travelling, looking for flint and following the animals



And here, the led group are discussing the petroglyphics:

That one looks like a tooth	Perhaps they're going to make a necklace For a chief?	A sign for a ceremony?	They could use symbols - communicate co-operate



The unled groups did not make so many different points as the led groups.

Finally, the led group made more groups of related points, revolving around one statement (denoted in the diagrams by a bracket }). Discussing the cave painting, for instance, someone said:

"It took a lot of skill
to draw the animals" ⟶ They had to remember their shape
They had to practice
They needed a steady hand
They helped each other
They passed on skills

This branching of a group of ideas from one statement was the result of the teacher saying, "What skills?"

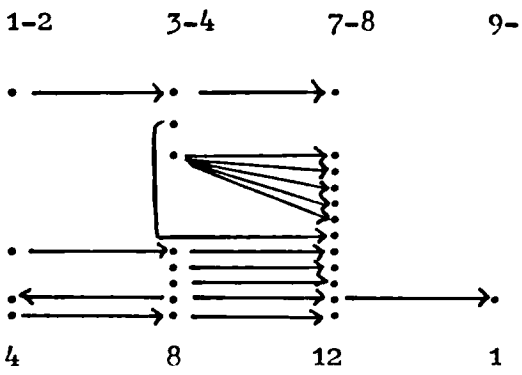
Both led and unled groups, then, were able to 'block dead ends' and develop arguments, but the led groups could make more points, produce more dependent statements from one premise, and make more generalising conclusions based on these.

Diagram 1 (b)

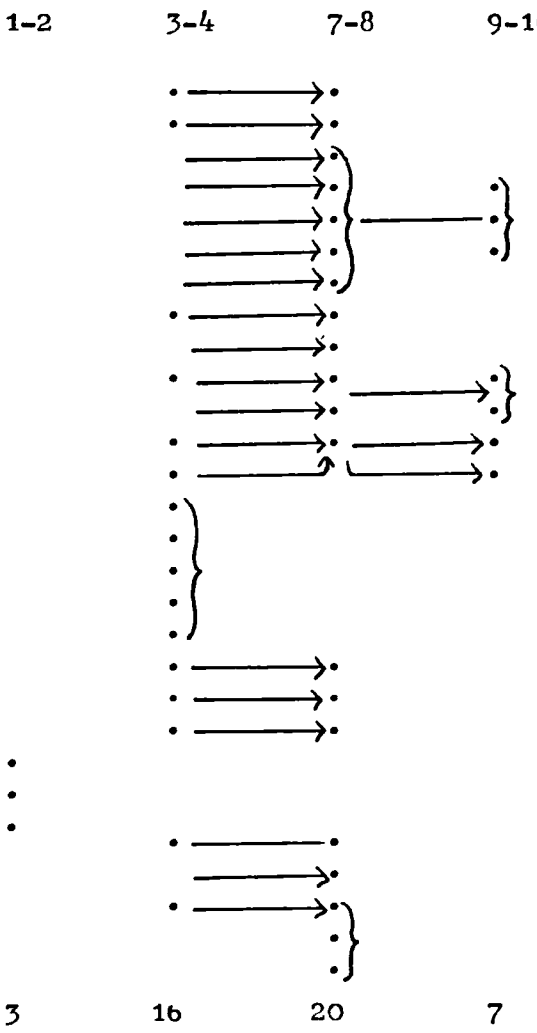
Comparison of Sequential Arguments in Led and Unled Discussions

Experiment 1. Led Discussion

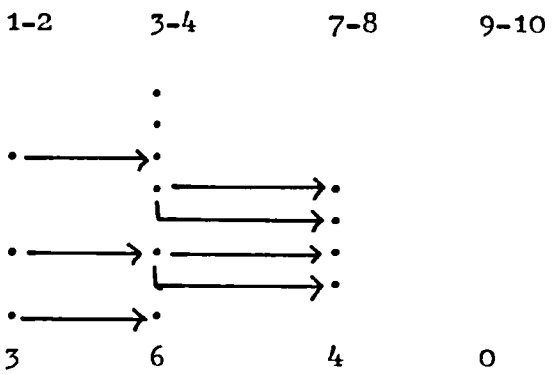
Test 1. Artefact. Palaeolithic Hand Axes

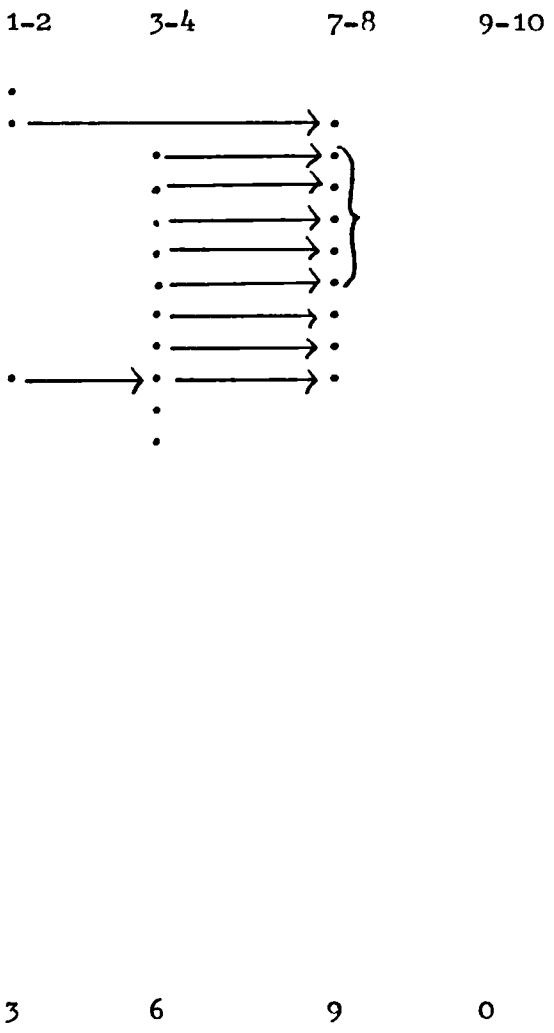


Test 2. Picture. Cave Painting



Experiment 2. Unled Discussion

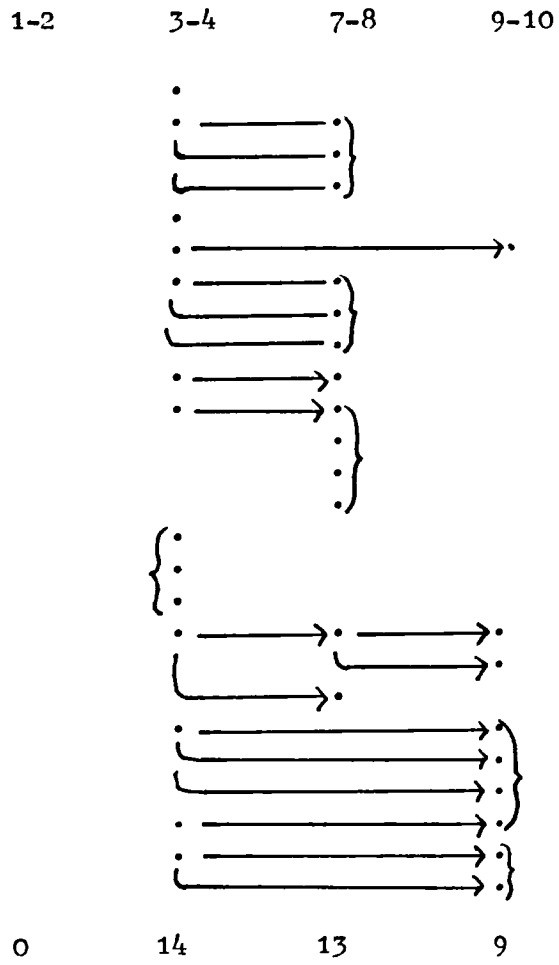




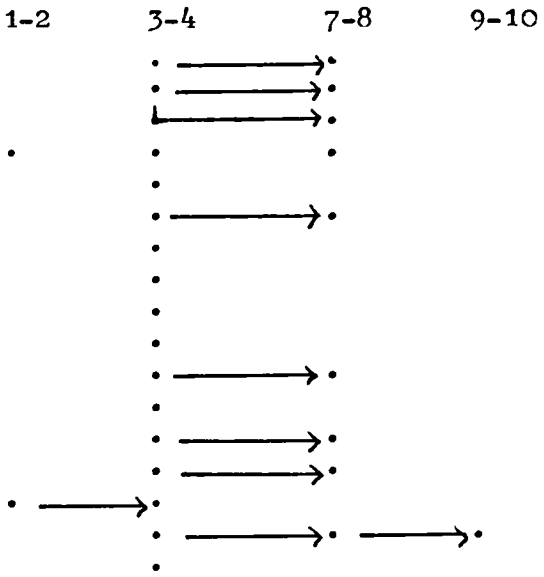
Comparison of Sequential Arguments in Led and Unled Discussions

Experiment 1. Led Discussion

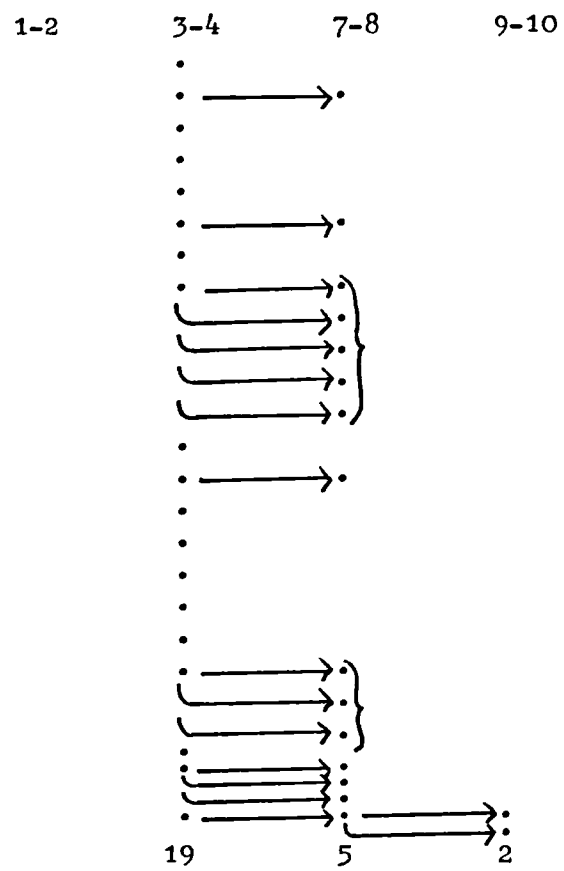
Test 3. Diagram. Stone Circle

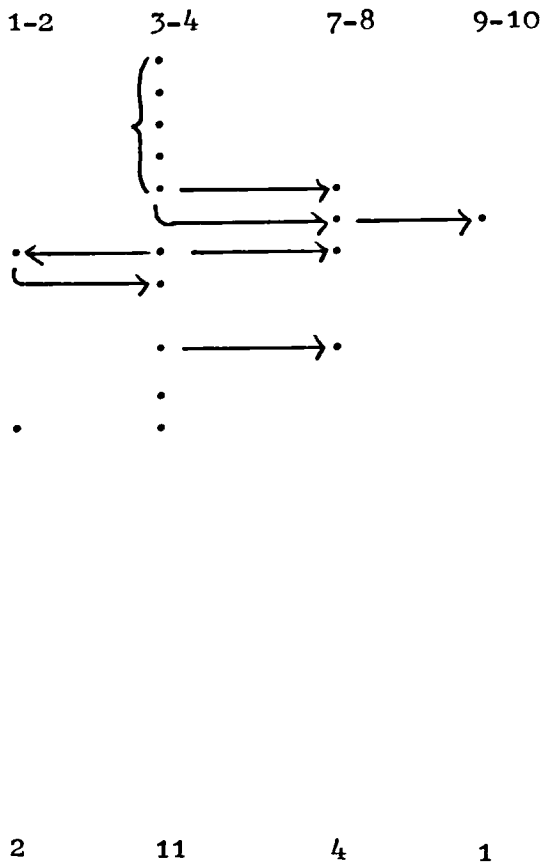


Experiment 2. Unled Discussion



Test 4. Map

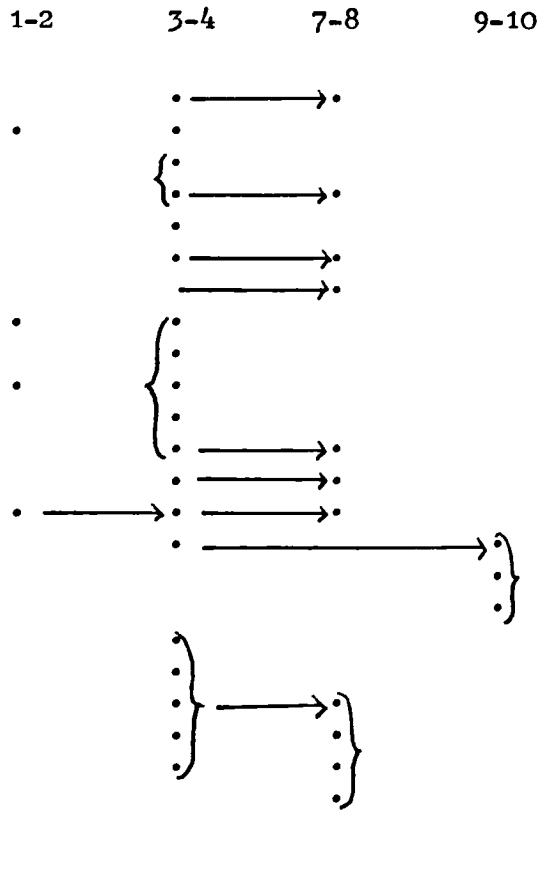




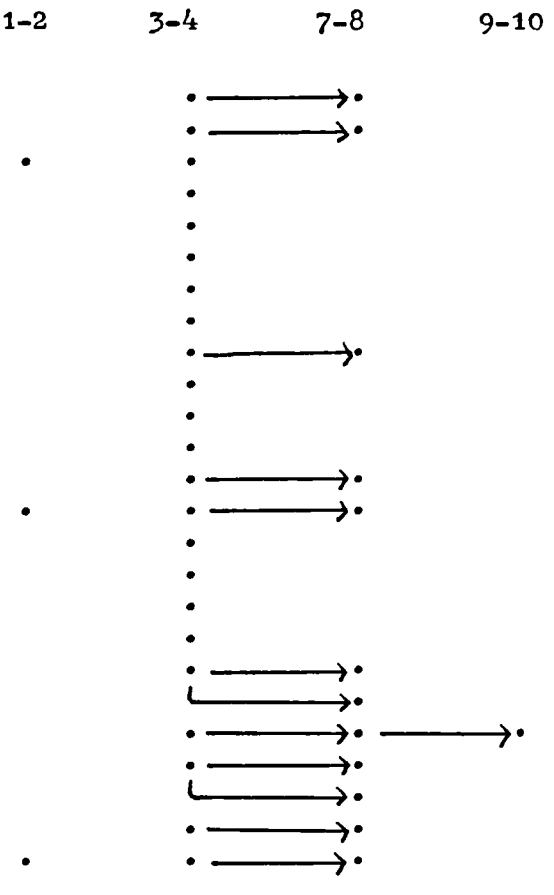
Comparison of Sequential Arguments in Led and Unled Discussions

Experiment 1. Led Discussion

Test 5. Writing. Petroglyphics



Experiment 2. Unled Discussion



(iii) Comparison of Written and Oral Evidence Tests in Each Experimental Group

Firstly, it seems that the led discussion groups do better in the oral test than in the written one: they make many statements at level 7 in the oral test and none in the written test. This is clearly because one child is able to develop another child's argument; together they can take arguments further than each child can on his own. For the unled discussion groups (particularly test 2) however, the reverse seems to be true: they made more sequential arguments in the written test than they did in the discussion group. This was probably because dominant members were keen to make each new point as it occurred to them, rather than develop it or think about someone else's.

Secondly, then, we need to consider whether it was more difficult for quieter children to contribute in the unled groups. It seems that this was not generally the case. Certainly, in Test 2, Exp 2., A.W. and D.F. were dominant, and K.B. and K.H. couldn't get a word in. These were the two girls in the group. K.H. said nothing, and K.B. - a generally verbally pugnacious little girl - was ignored once, and her idea interrupted and rejected on the other occasion! R.L., R.F., and S.D. in the unled groups also said little. Yet it is also true that, in the led groups, quieter children had less turns to speak: S.H., T.M., N.B., C.J., and R.D. said little and B.K. said nothing. Usually, the children who said little were the less able; their NVR and written evidence scores were also low (e.g. R.D. NVR 102, and B.K. NVR 88, R.L. and R.F. NVR 105, K.H. NVR 98). They had less to contribute. On the other hand, some children with low NVR scores and written evidence scores made several level 7 sequential statements, following on from another child's point. Clearly then, some lower ability children in both the led and unled groups were able to take their reasoning further as part of a group, where more ideas were generated, and more complex reasoning displayed. Which of the less able children who could benefit in this way, depended on an outgoing, sociable personality and difficulty in expressing themselves in writing.

Here are three such children. Their NVR and written evidence scores are low, yet they were able to develop other children's arguments.

G.L. NVR 86 Written Evidence Test 3. 3.1.3. Exp 1.

Ga. "It was hard for them to carry the stones." ——→ G.L. "It must have taken a lot of people to carry them."

N.H. NVR 105. Written Evidence Test. 6.2.6. Exp 1.

D. "It's muddy around the rivers on the day." ——→ N.H. "It's muddy and quite steep. It would be quite difficult to walk down for water. The fuels are on the top of a steep slope. There might be flint in the chalk."

and later in the discussion....

C. "I'd like to know if people were buried on top of the hill." ——→ N.H. "If so, it would tell us where they lived and if their skeletons were different from ours."

J.K. NVR 88 Written Evidence Test. 6.8.6. Exp 2.

S.W. "It (the symbol) could be a pyramid." ——→ J.K. "No. They wouldn't have pyramids. But it could be like Blackbird, in the story we've been having. She had a beautiful pattern on her tummy to show she belonged to her tribe. It could be a sign for a tribe."

It seems then, that in the led discussions, children form as many or more sequential arguments as in their written answers, but that in the unled groups they are less likely to follow up the points introduced. Some less able children make little contribution, whether in led or unled groups, while others in both led and unled groups perform at a far higher level than they do in the written evidence tests. Which way they react in a discussion seems to depend on their personality.

Finally, let us consider the richness, vitality and density of discussion of evidence, compared with individual written answers.

Here, the Exp. group 2 are discussing the cave painting:

A.W. "He's got no teeth."

A.W. "He's got to be a vegetarian."

D.F. "They might not have drawn the teeth. They don't in most paintings, do they?"

A.W. "They do sometimes."

Then they go on to discuss the colour of the animal:

A.W. "It's shaded red."

D.F. "The neck's darker."

A.W. "Yeah. Could be blood."

D.F. "Maybe they couldn't find any other colour."

A.W. "Funny if they ran out of paint just for this one."

D.F. "Could mean a lot of things - could mean the things we least expected - could be a rare animal now extinct...."

/continued....

Compare this with D.F. and A.W's' written answers, which are more precisely reasoned, but less original. In writing, the logic is the result of internal debate, while on the tape, the boys argue with each other.

Daniel, for Question 1. wrote,"3 of them are buffalows...they could observe them and store their ideas. And they could paint...they could make paint. So they could co-operate, and spread ideas."

And Andrew, for question 1. wrote "They painted on walls...they made colour, and they had animals...we can tell which animals they had. So they observed animals."

Here, another unled group shows serious reasoning and resolves the problem of the date of the stone circle:

K.C. "Mesolithic probably."

N. "Probably Neolithic, because the finds are pots."

M.F. "Yes. They learned to make pots in the Neolithic."

Interestingly, the led groups show less of this willingness to tackle a problem and solve it to their satisfaction, maybe assuming the teacher knows the most likely answer. They tend rather to rehearse the kinds of points made previously in lesson discussions.

Here, the led group are discussing the same painting:

A. "It took a lot of skills to draw them."

Teacher "What skills?"

A. "They had to remember."

C. "To practice."

H. "To have a steady hand."

T. "To help each other - to pass on skills."

Teacher "What words describe such skills?"

"Helping." "Sharing." "Caring."

Were children in the discussions able to differentiate between certainty and guessing, and recognise what they did not know, and did they find the last the most difficult, as in the written tests?

Now let us consider whether the children found question 3 (what would you like to know?) which they found most difficult to answer in the written evidence tests, easier to discuss in a group. The led groups were asked to consider the three questions separately as in the written tests. They found plenty of things that they would like to know for each kind of evidence,and were able to say why.

Test 1. They wanted to know why tools changed. Was it because the ice made the flint harder? Did they make ice axes in the ice age? Did they have other kinds of weapons? Because this would tell them what animals they killed and if there were specific weapons for different animals.

Test 2. They wanted to know what the people looked like, in order to know how far they'd developed, and why they didn't paint people, because this would tell us whether they were interested in people as much as animals.

Test 3. Why was the trackway there? Because it would tell us how they moved the stones, where from, and more about their 'rituals'.

Test 4. If they knew where the people were buried, they could find out where they lived, if the settlement was on the hill, or if the tools were dropped in passing, or if their skeletons were different from ours, and possibly they could be buried with more tools or weapons.

Test 5. Was it a message or a story? How many people did it, why and how long would it take? This would tell us if the new stone age people learned to communicate in symbols from the

people who did cave painting, but found painting too laborious for their new purposes!

The unled discussion groups however did not divide their thinking into three sections, but they clearly recognised the difference between knowing and guessing. Their discussions are dominated by guessing and probability words:

Test 1.	looks like:	I think		
Test 2.	could be (3x)	might not: looks like if probably I thought	usually: maybe (5x) might might have	could mean: that doesn't mean could be (2x)
Test 3.	may have could have maybe (3x)	perhaps what about probably	unlikely how do you think? what do you think?	could be (4x)
Test 4.	do you think? I suppose	they could I wonder probably	looks like doesn't look like	most often
Test 5.	looks like (10x) if...they may have maybe	could mean I think may have had	could be (7x)	could mean (2x)

They occasionally make <u>certainty</u> statements:

Test 1. Actually are They are sharp They were all chipped and smoothed.

It has a sharp point.

Test 2. It is shaded. The neck's darker red.

Sometimes they discuss certainty: "It's got two heads."

"That could be a tail."

"Bit thick for a tail."

or: "It's a buffalo!"

"It can't be. It's got a hump. Buffaloes don't, do they?"

Test 3. It has a ditch. There are 55 stones. There are 2 entries. One faces South West, and there are flints,

It is 30m diameter. It was found....11 years ago."

Test 4. There's clay - a river - chalk. A hill. The clay is by the river and the chalk is on the hill.

Test 5. Nothing is certain.

There are also some questions asked about what they would 'like to know'. This is seldom specifically stated, and clearly children in the unled groups found this the most difficult line of enquiry to pursue:

Test 1.

Test 2. It must have been done for some reason. (Long discussion as to what).

Test 3. How do you think they made the barks?

When do you think they made the stone circles?

Test 4. Whole discussion suggests meaning and purpose.

The unled group then, make an impressive distinction between what they are CERTAIN about and what they can GUESS, but are able to recognise what they do not know; but they are less able than the led group to explain for what reasons they need to know - what knowing would tell us.

Analysis of the discussion tapes, then, shows that both led and unled groups were able to distinguish between knowing and probability. The content of their discussions was similar; how things were made, how they were used, and what their significance was to the people who made and used them. Both groups were also able to develop sequential arguments about each kind of evidence.

However, the led discussion groups introduced more ideas, revolved more around each point, and produced more sequential statements and synthesizing conclusions. They also produced more higher level statements orally than in their individual written answers, by following up each others' statements, and found it easier to explain what they did not know, in a group, than they

did individually.

The unled groups did not produce as many sequential arguments orally as in their written answers and found it equally difficult to say what they did not know in their discussions as in their written answers. Their discussions also concentrated more on observed physical characteristics, and story-telling, to make their points.

A5 Analysis of the Empathy Test

The second experimental group was asked to write a story which might reveal their level of understanding of the attitudes, values and beliefs of another society. This test is explained in Chapter 2 (C3). The stimulus was a postcard which each child was given of the Barnack Grave, shown in Appendix XXXIV.

Analysis of Empathy Test Unit 1. Experimental Group 2

"Write a story called 'Death of an Archer' explaining who the man in the 'Barnack Grave' was and how he died"

Synopses of stories:

Level 1 - Accidental (grave goods no significance)

NVR Score		
105	R.L.	He was fighting when he found himself in a building set alight and the doorway blocked.
108	M.H.	He was doing pottery. He might have been shaping it with a dagger. The spear was to protect him. Someone came to the door and threw a flint at him and he fell into the fire.
111	L.W.	His necklace got burned so he killed himself. A long time after they found his bones everywhere so they collected them up and put them with a pot in a museum and made a postcard.
79	J.F.	He was hunting rabbits. He stayed in a cave with a fire. The wind blew the fire and it 'hit' him.
100	J.H.	Killed by a bear while selecting arrows. He was taken back on a stretcher and buried.
98	K.H.	Going to get berries for an ill man - killed by a mammoth. Buried. 'There is a bowl in the mud where he is and some more people were buried there'.

Level 2 - Matter of Fact (grave goods mentioned in a matter-of-fact way - no questioning of their significance).

120	D.F.	Rivalry between chief and archer. Archer killed. Chie decided to 'burn these men into shrimps' in a ceremony as a punishment. Archer's wife put some of his things around the fire before they burned him.
120	J.G.	Archer's village came under surprise attack from nearby tribe. He picked off men in hundreds before a burning arrow caught the hut on fire. (The)(He had said if I am to die I want my latest piece of work with me). They put his belongings in the grave

and filed past.

120 M.S. He had a whalebone pendant, and a pot for carrying water and berries. He was attacked and killed. They prayed to their god to help him. He was buried with his spear and his pot.

125 F.B. Wounded while hunting. A tribe looking for food found him. They didn't know who he was, but they had a burial service for him and 'did a special dance for him as well'.

117 M.F. Time-warp story. Archer died in a fire. Children bury him with his things - a bone necklace, a bronze dagger and a large pot.

135 M.H. Died in a fire. The village magic master took him and buried him.

111 K.C. He was a great war-man and could make things so all the tribes wanted him. He died in a war. The chief was very upset so he himself dug a grave and put some of his things in the grave.

111 K.B. One of the houses caught light. They put him in a grave with the bracelet and the pot.

99 K.G. Killed by a tribe while getting water. Bones kicked around by 'whoever did it'. He was wrapped up and put in a stone circle and they 'done a hand print' and 'prayed he had a happy life'.

Level 3 - Detailed Matter of Fact (more attention given to grave goods, but thei symbolic meaning not investigated).

88 J.K. He was chief archer, killed by a bear. 'The chief had a ritual for him' in a house. They put four things in the house: the chief put something and the people put something. They put food in the house. They had a ceremony to pray to the archer, then set fire to the house.

115	S.K.	If he was a chief, he might have had a great ceremony and a feast, and after, have a new chief.
105	R.F.	He was lame. He was laughed at so he ran away, and fell. He was weak; he couldn't move so he died. Stone Age people prayed to his god and came with herbs and spices....
88	N.T.	He must have had a ceremony. I'm sure there were lots of people there. He must have treasured his wristguard It must be really special to him because he worked with it all day, and he had it in his own grave with his bronze dagger and his pottery beaker and necklace. It must have been hard to be an archer, not being afraid of being killed every day.

Comments on Empathy Test Unit 1.

1. No child scored at level 4, by investigating the symbolic meaning of the grave goods. The answers fell into three groups: at level 1, the grave goods were assumed to be there by accident; at level 2, they were mentioned but with no attempt to explain their significance; at level 3, there was more attention paid to them as being related to 'ritual' 'a ceremony' 'prayer' but their meaning was not explained.

2. There seems to be a loose correlation between standardised NVR scores, evidence scores, and empathy levels at levels 1 and 2; but the three children who scored at level 3 had poorish NVR scores, and two had poor evidence scores. This implies that historical empathy is not solely dependent on 'intelligence

3. The stories show the children using the information they had acquired about the Stone Age from the novel 'The Dream Time' (he was lame; he ran away...rivalry between chiefs) and from lessons (he was put in a stone circle, and they done a hand print) (he had a pot for carrying water and berries). They are able to piece this knowledge together to form a background picture of a way of life, but do not question or attempt to explain the abstract ideas/beliefs implicit in that society.

Findings

B. Analysis of Unit 2. The Iron Age

B1. Statistical Findings.

(a) Comparison of the Written Evidence Scores of the control and experimental groups.

(b) Comparison of responses to the three types of question, within the three groups.

(c) Comparison of responses to the five types of evidence, within the three groups.

(d) Discussion of Significant Interaction.

B2. Concepts: analysis of concepts used by control and experimental groups in written evidence tests, and by the experimental groups in the led and unled discussion.

B3. Analysis of written evidence tests, showing how teaching strategies, which involve discussion of selected evidence using taught concepts, lead to the development of historical empathy.

(a) Test 1 — Artefact. The Waterloo Helmet.
Examples show that brief written answers may reflect complex internal dialogue learned through discussion.

(b) Test 2 — Picture. The Uffington Horse.
Examples show how discussion of open-ended questions helps to develop empathy.

(c) Test 3 — Diagram. The Iron Age House at Little Woodbury, Dorset.
Examples show how interpreting evidence and developing empathy depends more on teaching strategies than on NVR ability.

/cont....

/cont....

(d) Test 4 Map. Celtic Field System, Butser.

Examples show how both information and direct experience are combined and transferred to new evidence, and that this helps develop empathy.

(e) Test 5 Writing. Strabo 1, 4, 2. Description of British Experts.

Examples show how such discussion of evidence depends on taught concepts.

B 4. Analysis of Oral Evidence Tests.

(i) Comparison of content of led and unled discussions.

(ii) Comparison of structure of led and unled discussions.

B 5. Analysis of Empathy Test, Unit 2.

B 1. Statistical Analysis

Unit 2. The Iron Age

Table 8

ANALYSIS OF VARIANCE TABLE				
Source	SS	DF	MS	F
Between Subj cts	1798.59	59		
Main Eff ct A	581.41	2	290.70	13.61
Error for A	1217.18	57	21.35	
Within Subj cts	2896.40	840		
Main Effect B	29.44	4	7.36	1.89
Interaction A x B	33.63	8	4.20	1.08
Error f r B	887.33	228	3.89	
Main Effect C	347.25	2	173.62	65.30
Interaction A x C	38.87	4	9.72	3.65
Error for C	303.09	114	2.66	
Interaction B x C	11.99	8	1.50	0.56
Inter ction ABC	28.77	16	1.80	0.67
Error for BC	1216.05	456	2.67	
Total:	4694.99	899		

As in Unit 1, the analysis used was a three-way repeated measures design (two between, one within). In this analysis, the classes were the first main factor (A), the type of evidence was the second factor (B), the repeated measures factor (C) was the type of question. The complete design had 3 x 5 x 3 levels. The results are shown in full in Appendix XLVI(v).

The main effects in Unit 2 show that experimental group 2 has caught up with experimental group 1 and both these groups perform at a higher level than the control group. Question 3 continues to be more difficult than questions 1 and 2. There is no longer any significant difference in levels of response to the five types of evidence. The analysis of variance table (Table 8) shows a significant interaction between classes and questions (AC) which will be discussed later. (1 (d)).

Iron Age

(a) Main Fffect A A comparison of the written evidence scores between the control and experimental groups.

The main effect shows a significant difference between the written evidence scores of the three groups

($F = 13.61$ df 2, 57, $p < .05$)

The graph (Fig 2 (i)) shows that there is no difference between the means for the experimental groups. The difference lies between the two experimental groups and the control group.

The Sheffé test for multiple comparison showed significant differences between the means for the control group and the experimental groups, but not between experimental groups.

(a_1) vs (a_2) = $F^1 = 20.5$ $p < .05$ sig

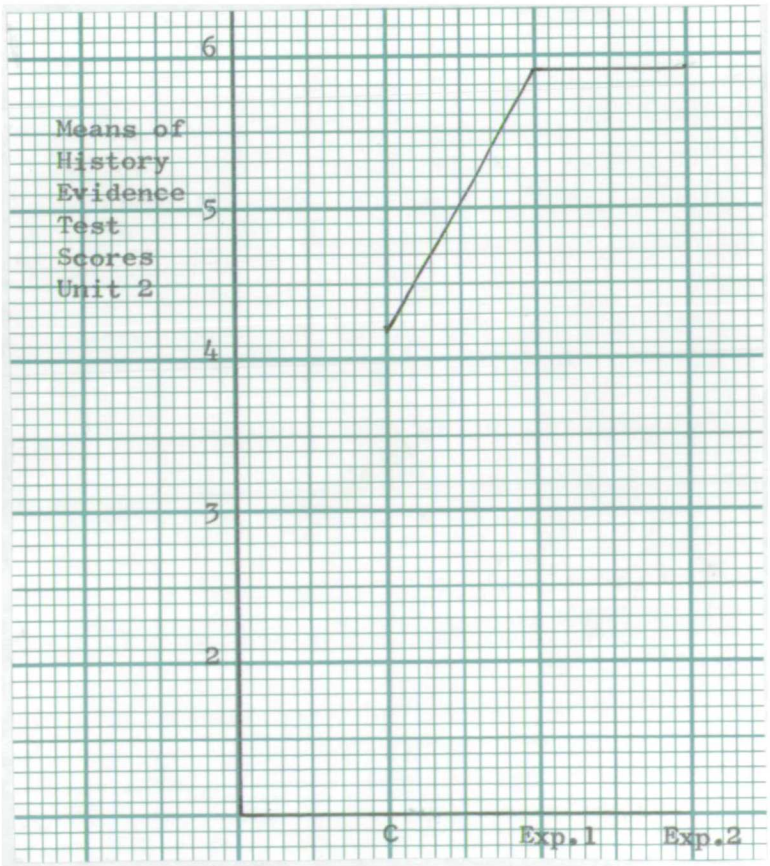
(a_1) vs (a_2) = $F^1 = 20.3$ $p < .05$ sig

(a_2) vs (a_3) = $F^1 < 1$ n.s

A comparison with means for main effect A in Unit 1 (Fig. 1 (i)) shows that experimental group 1 has improved and is now performing at a much higher level than in Unit 1, while the mean for the control group remains almost the same.

Fig 2 (i)

Graph showing means of scores for history evidence tests for control and experimental groups, Unit 2.



(b) Main Effect C A comparison of the responses to the three types of question within the three group .

Question one: what do you know for certain?

Question two: what can you guess?

Question three: what would you like to know?

There is a significant difference between responses to the three questions

($F = 65.30$, df 2, 114, $p < .05$)

A graph of the means shows the same pattern as in Unit 1 (Fig. 1 (ii)). The difference is accounted f r by question three, which children found much harder than questions one and two.

The Sheffé test for multiple comparison showed significant differences between the means for the first two questions and question three, but not between question one and question two.

(c_1) vs (c_2) = $F^1 < .01$ n.s

(c_1) vs (c_3) - $F^1 - 104.3$ sig

(c_2) vs (c_3) = $F^1 = 90.96$ sig

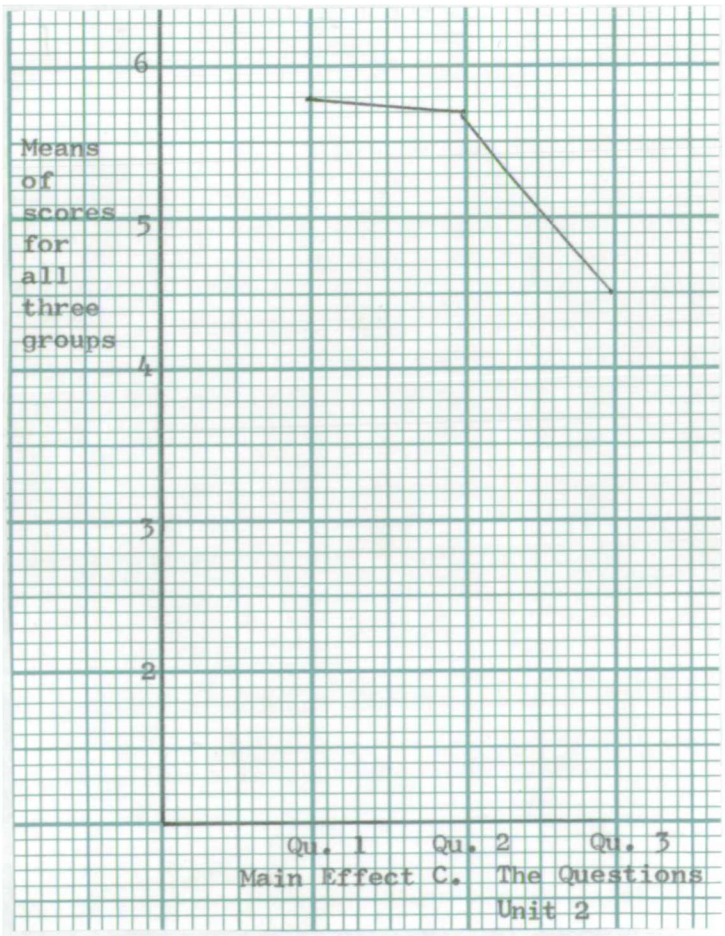


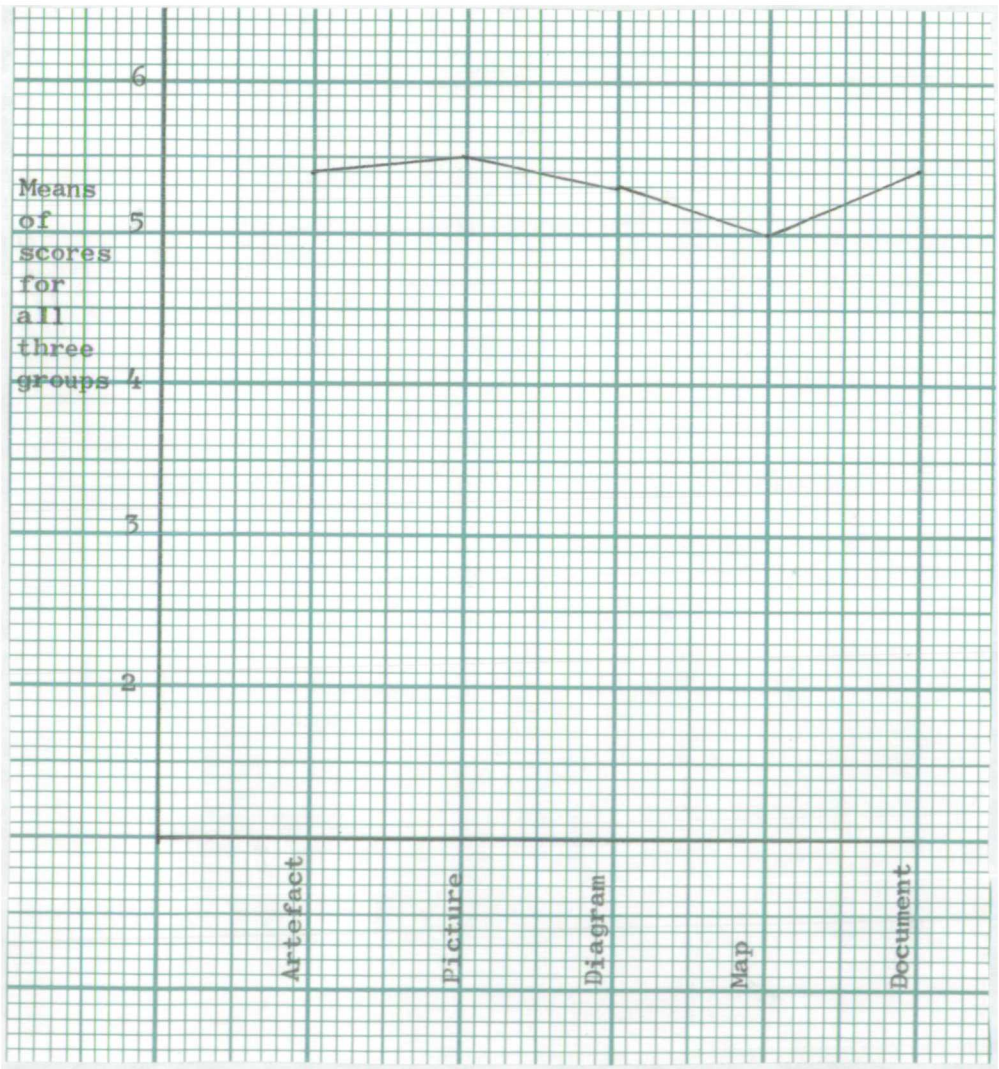
Fig 2. (ii)

Graph showing means of scores for each type of question for all three groups

(c) Main Fffect B A comparison of response to the five types of evidence within the three groups: artefact, picture, diagram, map, writing.

There was no difference in responses to the different kinds of evi ence in Unit 2. The significant difference at the <.05 level found in Unit 1 has been eradic ted, although a gr ph of the mea s shows the similar trend, the map and diagram being slightly mor difficult than the other kinds of evidence.

Fig 2. (iii) Graph showing means of scores for each tvpe of evidence for all three grou s, Unit 2.



Iron Age

(d) Discussion of significant interaction A x C

(F = 3.65 df, 4, 114, p<.05)

Experimental group 2 does not follow the same pattern of response for questions 1 to 2 as the other two groups. Experimental group 2 found 'knowing' slightly easier than guessing. (This tendency is found again in Unit 4). The control group, in all three units, found guessing slightly easier than knowing. This may be because the experimental groups had more information than the control group, and experimental group 2, being more highly motivated, recalled it more readily, particularly in this unit.

However, all three groups found 'what would you like to know?' by far the most difficult question. (This was true in Unit 1, and also in Unit 4). The main effect, thus accounted for by Question 3, remains very strong.

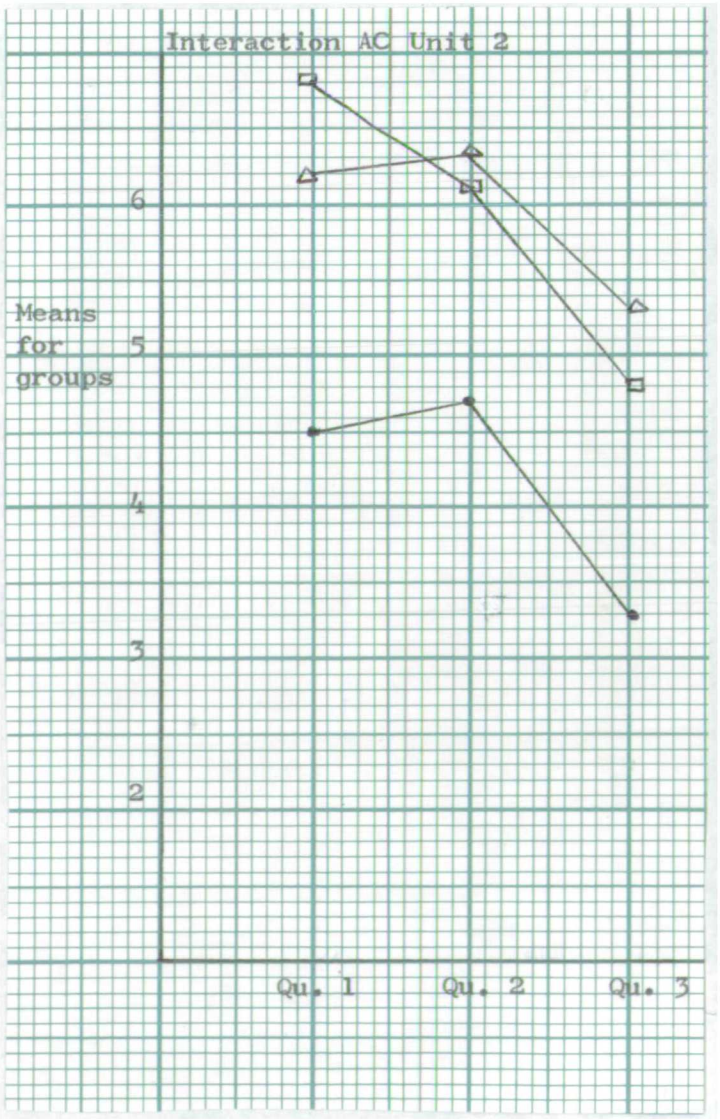


Fig 2. (iv) Graph showing interaction between means for each of the three types of question for the control and experimental groups.

B2 CONCEPTS:

Analyses of concepts used by control and experimental groups in written evidence tests, and by the experimental groups in the led and unled discussions

Analyses of taught concepts in Unit One showed that children in experimental group 2 used most of the taught concepts in answering the written evidence tests. (Bar chart 1). (Lists of taught concepts are given in Appendix VI). Therefore, in analysing Unit Two, taught concepts used by both the experimental groups were recorded. Although experimental group 2 did better than experimental group 1, both groups used most of the concepts they had been taught, while the control group used few of these key concepts. (Bar chart 2.1). The experimental groups used similar numbers of concrete and abstract concepts, but few superordinates. The control group used no superordinates. The experimental groups also used vocabulary in Unit Two which they had been taught in Unit 1 (Tables (a) and (b)).

In Unit One, both experimental groups used some of the taught concepts in the oral evidence tests, although the led groups used more than the unled groups (Bar chart 1.2). In Unit Two, the two groups used similar numbers of concrete and abstract concepts, but the unled group used less superordinates (Bar chart 2.3). In the oral evidence tests, both led and unled groups also used some of the concepts learned in Unit One (Table (c)).

Bar Chart 2.1

TAUGHT CONCEPTS IN UNIT 2 USED IN WRITTEN EVIDENCE TESTS

1 cm. represents 1 concept used by 1 child correctly

repres. Exp. Group 1 child

repres. Exp. Group 2 child

repres. Control Group child

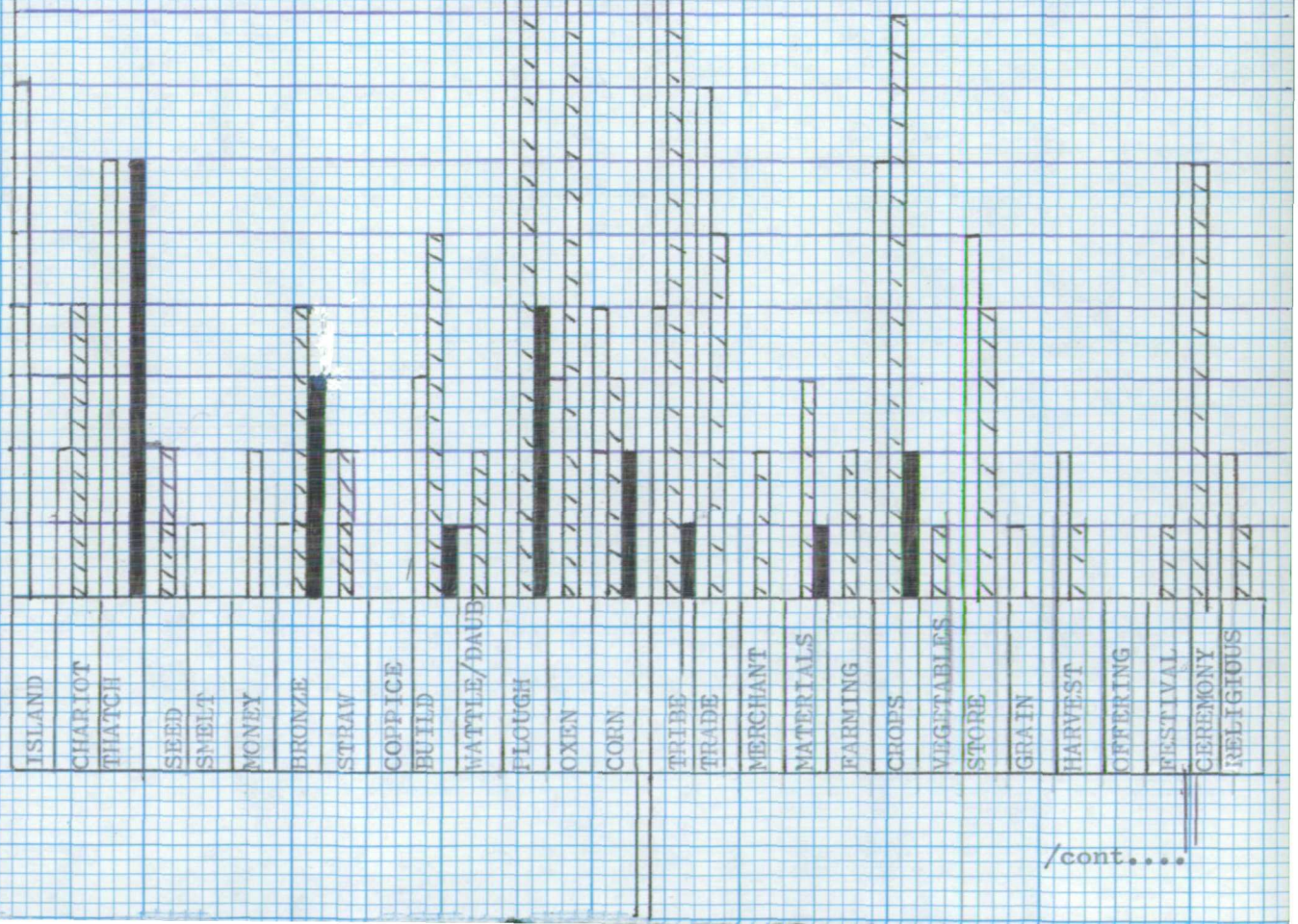
Concrete Concepts

Exp. 1 44
Exp. 2 43
C 16

Abstract Concepts

Exp. 1 23
Exp. 2 46
C 4

This bar chart shows that although exp.2 did better than exp. 1, both groups used the concepts they had been taught, while the control group used few of these key concepts. The exp. groups used similar numbers of concrete and abstract concepts, and fewer superordinates. The control group used no superordinates. They appear to use their natural vocabulary. The bar chart illustrates the acceleration effect of teaching specialised concepts in the exp. groups.



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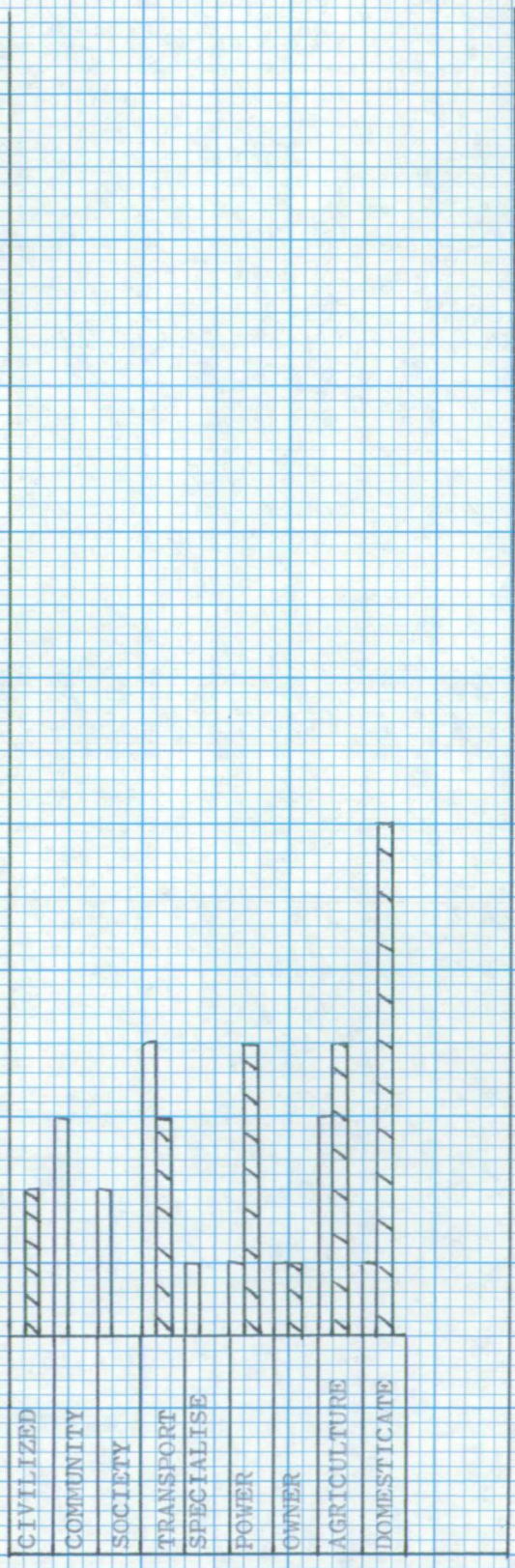
/cont.... Bar Chart 2.1

SUPERORDINATE CONCEPTS

Exp.1	16
Exp.2	28
C	0



Bar Chart 2.2

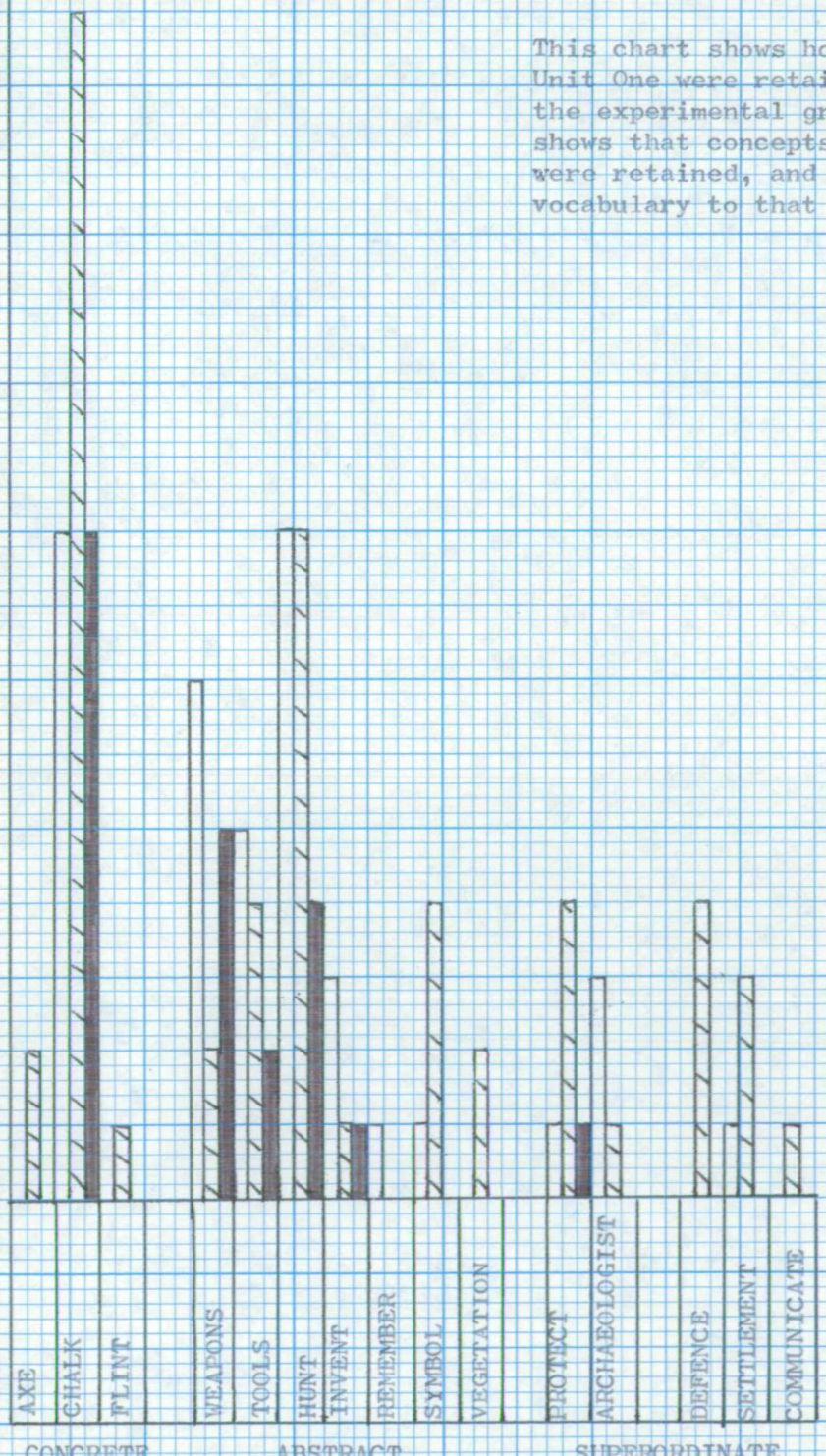
CONCEPTS TAUGHT IN UNIT ONE WHICH WERE USED IN WRITTEN EVIDENCE TESTS IN UNIT TWO BY EXP. 1, EXP. 2, AND CONTROL GROUPS

Concrete		Abstract		Superordinate	
Exp. 1	9	Exp. 1	26	Exp. 1	5
Exp. 2	19	Exp. 2	22	Exp. 2	13
C	9	C	12	C	1

Total

Exp. 1	40
Exp. 2	54
C	22

This chart shows how concepts learned in Unit One were retained, ~~or~~ in active use by the experimental groups in Unit 2. It shows that concepts at all three levels were retained, and their superior vocabulary to that of the control group.



The following table shows how both experimental groups frequently used the concepts they had been taught, at all three levels, in their written evidence tests, while the control group used almost no special vocabulary because they had not learned any. The experimental groups use fewer taught concepts in the Unit 2 tests because they had been taught fewer in this Unit, but it is encouraging that they also used vocabulary they had learned during Unit 1 which they had retained.

Table (a)

	CONCRETE				ABSTRACT				SUPERORDINATE			
	Taught	Used			Taught	Used			Taught	Used		
		Exp 1	Exp 2	C		Exp 1	Exp 2	C		Exp 1	Exp 2	C
Unit 1	22		127	81	14		65	45	21		36	1
Unit 2	14	44	43	16	12	23	46	4	12*	16	21	0

*incl. 6 from Unit 1

Table showing taught concepts correctly used by individual children at least once in written evidence tests 1 - 5 in Unit 1, and in Unit 2. Lists of taught concepts are given in Appendices V - VIII.
The table is made from graphs given on p 137-138 (Bar Chart 1.1) and p 194-195 (Bar Chart 2.1).

Table (b)

CONCRETE			ABSTRACT			SUPERORDINATE		
Exp 1	Exp 2	C	Exp 1	Exp 2	C	Exp 1	Exp 2	C
9	19	9	26	22	12	5	13	1

This table shows the number of concepts taught to the experimental groups during Unit One, which were retained and used in answering the written evidence tests in Unit Two, at least once, by individual children. It is based on Bar Chart 2.2, page 196.

The table shows that Exp. 1 used a total of 40 concepts learned in Unit One, and Exp. 2 used a total of 54; the Control group used only 22 of these concepts.

This table shows taught concepts used in the led and unled discussion tapes on one or more occasion, in Unit 1, and in Unit 2. It is based on the bar chart 2.3, page 199.

Table (c)

	CONCRETE			ABSTRACT			SUPERORDINATE		
	Taught	Used		Taught	Used		Taught	Used	
		Led	Unled		Led	Unled		Led	Unled
Unit 1	22	18	11	14	16	4	21	11	8
Unit 2	14	11	9	12	9	8	12	10	1

This table shows how both led and unled discussion groups in Unit 2 used some of the concepts taught during Unit 1 on one or more occasion. It is based on the graph on page 200 (Bar Chart 2.3 cont.).

Table (d)

	Concrete	Abstract	Super-ordinate
LED	1	6	6
UNLED	2	3	4

Bar Chart 2.3

THOUGHTCONCEPTS IN UNIT 2 USED IN DISCUSSION TAPES

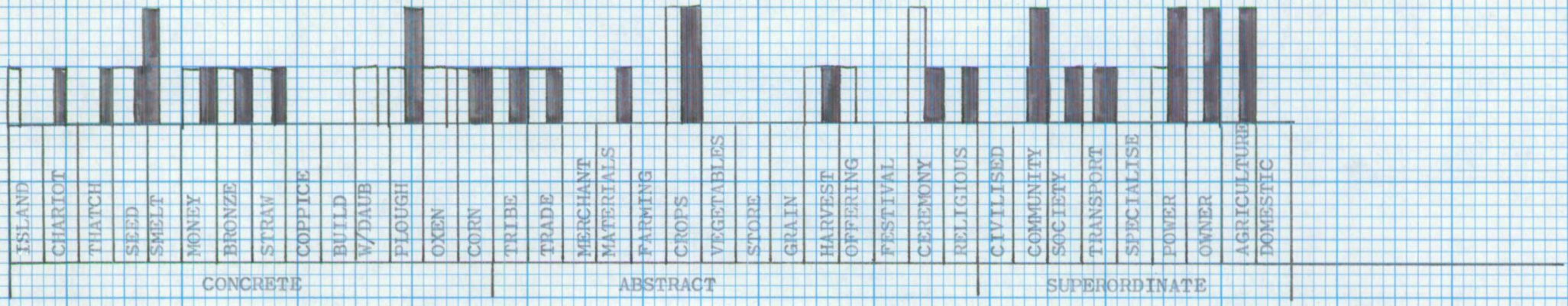
1 cm represents the use of the concept in one evidence test on one or more occasion

▮ represents led discussion groups (Exp. 1)

▯ represents unled discussion groups (Exp. 2)

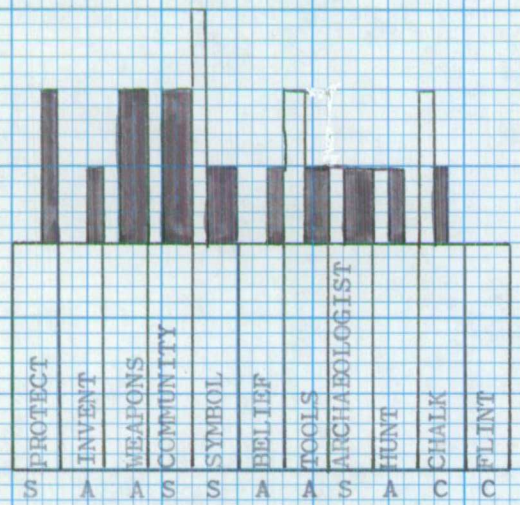
Led (Exp. 1)		Unled (Exp. 2)	
Concrete	11	Concrete	9
Abstract	9	Abstract	8
Superordinate	10	Superordinate	1

This bar chart shows how both the led and unled groups used their taught vocabulary in discussion, and, when appropriate, used concepts learned in Unit 1. The led groups, however, used more superordinates than the unled groups.



CONCEPTS TAUGHT IN UNIT 1 USED IN UNIT 2 DISCUSSION TAPES

Led	Concrete	1	Unled	Concrete	2
	Abstract	5		Abstract	3
	Superordinate	6		Superordinate	4



Bar Chart 2.3 continued.

B3. Analysis of the Written Evidence Tests. Unit Two

It was argued in the introduction that interpreting evidence involved asking a wide variety of questions about it, which lead to further questions, and give rise to a range of suggestions about how it was made and used, and what it may have meant to people at the time. These supposals are tied by criteria to the evidence: Are they likely in the light of what is known about the society that produced it? Is there other evidence to refute or support them? Within these criteria, rival interpretations are usually possible, and evidence is often inconclusive. The ability to generate a variety of supposals based on hypothetico-deductive reasoning about evidence, constitutes an important element in historical imagination. This is the vehicle which makes the development of historical empathy possible.

Empathy, as defined in this thesis (Ch. 2, A2 (i) Diagram 5), is the achievement of an understanding of the ways in which people in the past may have thought, felt and behaved differently from us, because of the different knowledge base, belief systems, and economic and social constraints of the society in which they lived. It develops through making a rich variety of supposals about the evidence. It is only possible to begin to understand the people who created a piece of evidence, be it an artefact, a cult object, a settlement, a building, or a piece of writing, in so far as it reveals the possible ideas and feelings which gave rise to it. This is an integral part of the process of interpreting historical evidence. At the same time, it cannot be used as evidence until its meaning, its place in society, is considered.

In Unit One, we noticed a difference in quality between the answers of the experimental groups and the control group. The control group's answers were often characterised by anachronism and stereotypes, were

more likely to be direct rephrasing of received statements, and showed little movement beyond the information given. The experimental groups, however, showed a disposition to generate a range of ideas, hypotheses and suggestions about the evidence.

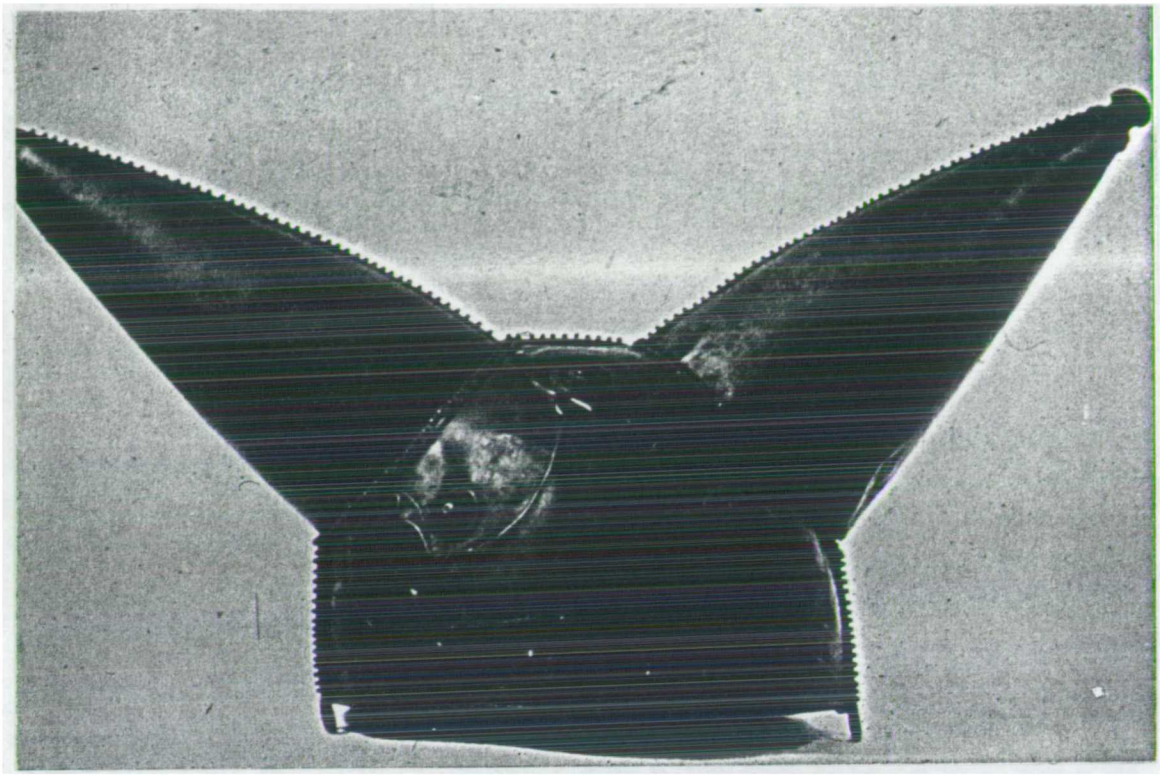
Analysis of Unit Two will seek to relate this difference in the quality of answers to teaching strategies, and to suggest that open-ended discussion of evidence, using language as an objective tool, led the control group towards a greater degree of historical understanding in which, in an embryonic form, historical imagination and empathy play a central role in making deductions about evidence.

In discussing the Waterloo Helmet, we shall see how the experimental groups ask specific ordered questions about how it was made, what it was used for, and what it may have meant to people at the time. And we shall see how their ideas in the discussion tapes expand and illuminate their written answers. In the answers about the Uffington Horse, we shall consider how open-ended discussion of evidence helped to develop imaginativethinking; by this, I mean the ability to generate a number and range of ideas suggesting worthwhile enquiry, to select from them and test them in the light of what the children know about the society which produced it. In Test 3, the interpretation of the Iron Age Hut plan, we shall see how teaching strategies based on open-ended discussion seem to be more important than NVR ability in developing historical imagination. In Test 4, the map of Iron Age fields, we shall see how children combine information and direct experience, and employ both in interpreting new evidence. In Test 5, we shall examine children's experience of taught concepts, sequential arguments and of language as an objective tool,and see how this affects their ability to interpret purely linguistic evidence.

There is no claim that the children in the experimental groups have

achieved true empathy because they are immature, and their knowledge is limited. However, it does seem that they have embarked on a process which involves making a variety of suggestions about how things were made and used, which are in accordance with the little they know about the society which produced them, and that this leads them to consider the feelings and thoughts of the people who made and used the helmet, the chalk horse, the hut, the fields, and the writing. This suggests that the process of making a range of valid suppositions about evidence may eventually lead to the achievement of genuine historical empathy.

Test 1 The 'at rloo Helmet



In analysing this test, we shall see how the brief written answers are the tip of the iceberg in the children's thinking. The same ideas are expres ed in a more discursive way in the ta ed discussions. These taped discussions are themselves a reflection of the kinds of discussions which tookplace in the class lessons.

The control gro p's a swers showed lower lev ls of d du tive argument than those of the experimental gro ps (Fig 2 (1)), and were often characterised by received ideas a d anachronism. They frequently s y that people in the Iron Age were mor ci iliz tl before.

F.S. "The helmet shows tl ey had wars...they had learne to fight humans instead of an'mals...so altog ther they wer more civilized."

T. '. "They were better fighters than before.'

J.W. "Bronze is not a very sharp metal...iron is a s arp metal."

L.M. "They had to find iron and bronze before they done anything

C.S. "They could draw on walls, to plan their helmets, swords etc."

(This statement reveals no understanding of change and time, although she scores at level 8 on grounds of logic in the answer as a whole).

By contrast, the experimental groups drew on their information about how iron is smelted, their concept of trade learned through discussing Sicculus and Caesar, their visit to the British Museum, where they had seen the Waterloo Helmet as well as swords and shields and a model chariot, and on their class novel 'The Changeling' by Rosemary Sutcliffe.

Both the control and the experimental groups' answers were analysed under three headings: How was it made? What was it used for? What did it mean to people at the time? This is Collingwood's series of specific questions to ask of evidence. It is interesting that both experimental and control groups made suggestions under the first two headings about how the helmet was made, and what it was used for, although the experimental groups suggested a wider range of possibilities and more imaginative insights. This may account for the fact that the experimental groups also offered suggestions under the third heading 'what did it mean to people at the time?' They were disposed to consider how people of a different time may have thought and behaved, whereas no control group answers could be found for this category.

These examples show how the three questions were considered in the written test and discussed more fully in the discussion tapes by the experimental groups, then their written answers are compared with those of the control group.

Experimental Groups

Written Test	Discussion Tapes
I How Was it Made?	
H.C. Exp 1. Qu. 1 (7) NVR 97 'They had metals...they could make things.'	J.H. Exp 2. NVR 100 'They made it carefully with the right kind of metals. Certainly they used a mould and little rivets'
J.G. Exp 2. Qu. 1 (8) NVR 120 'They could smelt iron and bronze ...they had a furnace for getting iron out of rock...'	M.F. Exp 2. NVR 129 'They had the right tools to shape the metal'
I.W. Exp 1. Qu. 1 (8) NVR 123 'They had charcoal to separate metal from ore'	N.H. Exp 1. NVR 105 'They could print patterns on it. They had a habit of putting circles on their working'
M.L. Exp 1. Qu. 3 (8) NVR 102 'I would like to know if the horns were hollow, because if they are it would be lighter'	G.P. Exp 1. NVR 133 'They had weapons - shields and swords too. At the British Museum, I copied a sword with a bronze hilt'
R.L. Exp 1. Qu. 1 (9) VNR 107 'They must have had good minds to remember things...they knew how to get to learn'	N.H. Exp 1. NVR 105 'They invented things. They knew how to smelt metal

These children have considered in detail the processes of making things from metal and the social achievements this represents. The control group, on the other hand, tend to make observations of a general nature:

L.B. NVR 119 'They made it neatly'

C.J. NVR 133 'It was hard to make'

L.M. NVR 136 'They were highly skilled'

J.W. NVR 122 'They knew how to make metal'

Three children begin to think more specifically about the processes involved and ask questions, but do not suggest possible answers:

N.L. NVR 104 'How did they make the pattern?'

M.B. NVR 95 'How did they make the studs that hold the metal together?'

D.H. NVR 105 'How did they make the horns?'

The only child who attempts, not very successfully, to transfer viewpoint and suggest an answer to such a question is:

C.S. NVR 136 'I wonder if they drew on walls to plan the helmets?'

The only child in the control group to try to articulate the social and intellectual achievement this evidence represents is:

L.M. NVR 136 'They were highly skilled and took a long time to think it out. It was a clever idea and they had to find the iron and bronze before they done anything.'

Similarly, the experimental and control groups both considered the second question 'what was the helmet used for?' However, the control group did not regard it as a ceremonial symbol or trophy or as a reflection of trade, as the experimental groups did. They considered it only as protection in battle, and their answers show that even then this did not lead them to discuss the possible reasons for fighting or the implications for other weapons or armour.

Experimental Groups

Written Test	Discussion Tapes
II What was it used for?	
a) for protection in battle	
H.G. Exp 1. Qu. 2 (9) NVR 129 'They wore it to protect their heads...they had fights. They made it...they made weapons. They had wars.'	Exp 1. It's got horns. It looks fierce - like an ox that could kill. Like a Stone-Age hunter's deer antlers - to hid in the bushes. The pattern could show what side you were on so you didn't kill your own men.
M.F. Exp 2. Qu. 3 (5) NVR 129 'I would like to know how they got the idea of armour, and why did they fight?'	They fought for food. If there was a bad winter and cattle died...to steal another tribes' cattle, or to cut another tribes' corn if they didn't have enough.

b) as a ceremonial symbol or trophy

K.C. Exp 2. Qu. 2 (8) NVR 111

'It might be made for a chief.. he would wear it at ceremonies to look special'.

N.H. Exp 1 Qu. 2 (8) NVR 105

'They might have used it at chariot races..they might have had it as a medal. They might have liked beautiful things and had it as an ornament.'

S.H. Exp 1. Qu. 2 (6) NVR 104

'It might have been for a goddess.'

N.H. Exp 1. NVR 105

Maybe the more metal you had it showed how high up you were. They'd start with a bracelet 'til they were all covered in metal then they'd be a chief.

Exp 2.

It may have been awarded for extreme bravery in battle. Or in a contest for new warriors. Maybe they had races and contests, and the armour was awarded for use in a battle.

Exp 1.

If they found other things in the River Thames, they may be offerings to a water goddess, to thank her for water to drink.

c) a commodity to trade

E.S. Exp 1. Qu. 3 (7) NVR 129

'How did the archaeologists come to find it, because it would tell me if it was made there, or if they traded them.'

R.L. Exp 1. Qu. 3 (8) NVR 107

'And was there one people in the place who made them?...if he did he would be rich.'

Exp 2.

They could have traded it for helmets made in another land. Or maybe for metal to make more weapons. Maybe, as we learned in a lesson, Julius Caesar wrote they used rods of equal weight, or coins, to trade. They could have traded it for bronze or iron - probably for metal of some kind.

The control group suggestions about the helmet's use are far more restricted:

L.B. NVR 119 'They had been in battle'

A.R. NVR 106 'They were used in battle'

J.C. NVR 107 'It was to protect them'

F.S. NVR 108 'It shows they had wars - (it was to protect their head')

D.H. NVR 106 'So their men can fight better'

P.C. NVR 115 'It tells me they went to war'

S.J. NVR 127 'To protect the head from daggers or charging people'

Again, only two children ask questions without attempting to suggest answers to them.

A.R. NVR 106 asks: 'would the spikes protect the man?'

and

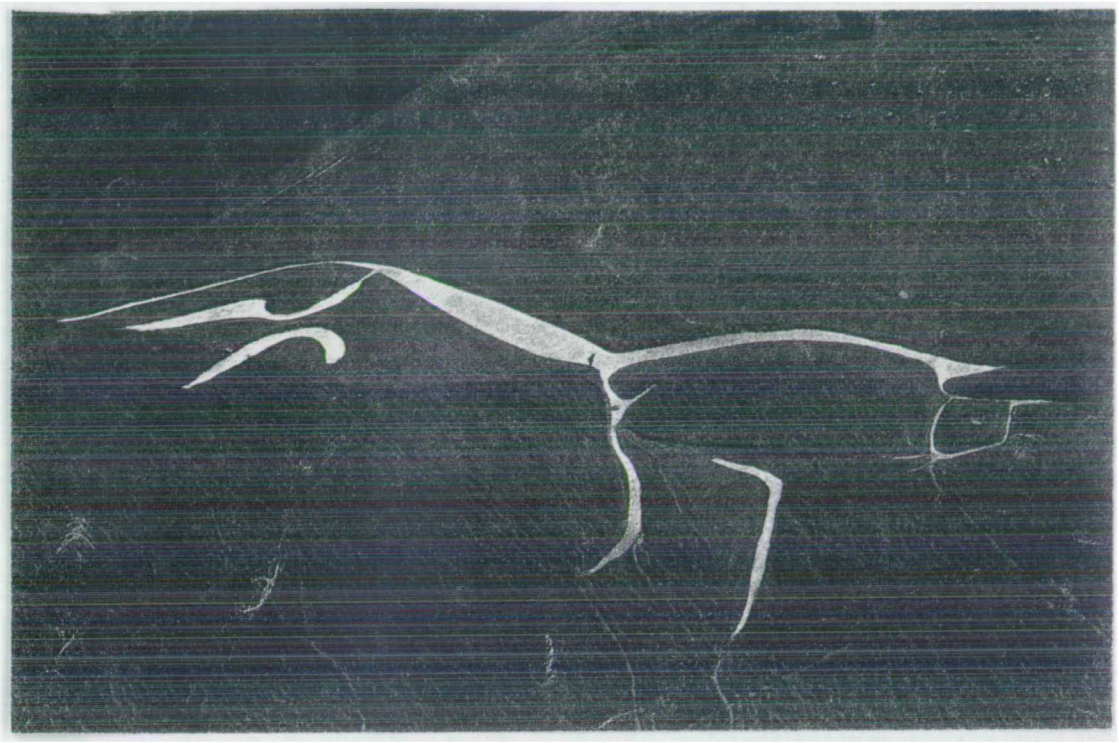
C.J. NVR 133 wonders: 'they had strong men so why did they need weapons so much?'

In fact, the attitude of the control group seems summed up in L.B.'s (NVR 119) answer to question 3: 'I would like it if they lady who is asking Mr. P. would come and talk to us'

Written Test		Discussion Tapes	
III What did it mean to the people who wore it?			
P.C.	Exp 2. Qu. 1 (8) NVR 114 'They were not afraid of going into battle...they looked fierce...they put fierce patterns on them'	Exp 2.	The patterns make it look sort of mysterious - they look like flowers...it might mean something like 'long live our tribe' or 'our tribe is the horse tribe'. Or special orders from their God. Or a magic helmet to help them in battle. On the wearer's name. Or to describe the wearer - how good he was at hunting or fighting.
M.L.	Exp 1. Qu. 2 (7) NVR 102 'I guess it had a kind of strap'	Exp 2.	The strips at the side probably had vines or strings attached to hold it onto the wearer...
K.L.	Exp 1. Qu. 3. (8) NVR 107 'Did they make different shapes and sizes, because it would have to fit...?'		they must have put something on it to make it shine...maybe it was made to measure for the wearer's head.
D.S.	Exp 1. Qu. 3 (5) NVR 88 'I would like to know what it felt like to put it on. It must have been heavy to handle'	Exp 1.	It's so heavy they probably took it with them and put it on when they got there.

As has already been said, none of the control group's answers could be categorised as supposing what the helmet may have meant to people at the time. This seems to suggest that empathetic deductions about evidence result from learning to discuss its significance, and to test a variety of suggestions, and in this way beginning to develop historical imagination.

T st 2 Picture. The Uffington Horse



In this test, we shall see how open-ended discussion of evidence helps to develop historical imag nation and so historical empathy, by encouraging a number and range of ideas, and the ability to select and test them. This connection has been recognised by psychologists who have attempted to define creativity and ways of developing it.

Guilford (1959) defined creativity as fertility of ideas, experimental and ideational fluency, together with a willingness to accept uncertainty in conclusions. Roger (1959) saw it as a n vel relational product growing out of the interaction of the individu and his material. Torrance (1965) tested children's ability by asking them to suggest causes and results related to a picture, while uilford asked them to suggest possible uses or adaptations for an obj ct. The evidence tests in this study require similar responses. However, it is important here to stress that although creative thinking, as defined by Guilford, Rogers and Torrance, includes imagination;

imagination in history must meet public criteria within the discipline, as set out at the beginning of this section. It must consider what the evidence may have meant to people at the time, and it is only valid if there is no other evidence to refute it, yet within these criteria, rival interpretations are possible.

The experimental groups' answers were probably more historically imaginative because they had been taught to think adventurously, in the way that Haddon and Lytton (1968) and Parnes (1959) have shown is possible.

Firstly, both control and experimental groups consider how the Uffington Horse was made, but the control group say, in a literal way, that it was carved in the chalk using special tools, and are critical or its unrealistic appearance, whereas the experimental groups are more inclined to suggest why the horse may have been drawn in this way.

Here are the control group suggesting how the horse was made:

L.M. NVR 136 'I guess they dug up the grass and mud and got to the chalk. They had skill. I would like to know what tools they used.'

J.W. NVR 122 'They knew how to cut away the grass. Therefore they probably had certain tools. They needed lots of people to cut the shape. They chose the ground because it was white under the grass.'

B.P. NVR 129 'They carved it on the hillside because there was a lot of chalk.'

C.J. NVR 133 'The Iron Age dug up the horse.'

C.S. NVR 136 'They had sharp tools so they could cut the grass away.'

N.L. NVR 104 'It was carved with a sharp blade.'

S.J. NVR 127 'I think the tools they used was a sharp dagger or something.'

When they go beyond these matter-of-fact statements, there is little attempt to wonder why the horse may have been drawn as it was.

M.B. NVR 95 'They were not very good at drawing. Therefore they used chalk.'

F.S. NVR 113 'They did not waste the chalk. Therefore they used it to make models.'

P.C. NVR 115 'They pictured it and carried it very carefully. It may not look like a horse, but it is meant to be.'

N.L. NVR 104 'It looks funny.'
'They were not very good at drawing.'

N.C. NVR 114 'I would like to know...why it looks silly.'

By contrast, the experimental groups seem to be trying to suggest why people may have drawn an unnaturalistic horse.

E.S. NVR 129 (Exp 1. Qu. 3 (6))
'Was it a picture of a horse in his mind, or a picture that he could see, because that would tell me if it was sketched or not.'

D.S. NVR 88 (Exp 1. Qu. 1 (7)) owns a horse and brings her own keen interest to bear, in spite of difficulties with spelling!

> 'I kown that they had Horse Because it is a piter of one. They must of copid the Bones of the Horse And the shape of the Horse And it must of bein bukin because of its back legs and the sape of it...'

M.H. NVR 135 (Exp 2. Qu. 1 (9))

> 'Two of the legs do not join up to the body. Therefore I think that is a special 3D effect. It has whiskers on a kind of chin. Therefore either they have not observed well, or their horse has whiskers.

H.G. NVR 129 thinks that it was strange to carve a horse, when 'most of the time they killed animals', and B.K. wonders if they measured it, and if so if they had standard units or 'measured it in men'.

Secondly, both control and experimental groups also considered why the horse was made, and what it may have meant to the people who made it. (Presumably the control group raised this question because, unlike the helmet, it had no obvious utility). The control group generally simply say that 'they probably worshipped the horse', while the experimental children are more likely to try to suggest why the horse may have had special significance for them.

Two children in the control group questioned why the horse was made, but did not suggest a reason.

D.H. NVR 106 'Why did they draw it I would like to know.

J.C. NVR 107 'If there was no reason for it, it would not be there.'

Maybe L.B. NVR 119 reflects their frustration when she says:

'I wish we had more books on the Iron Age'

However, the typical response is simple, closed and unreflecting:

B.P. NVR 129 'I think the Stone Age (sic) people worshipped the horse.'

N.C. NVR 114 'They had horses. Therefore they worshipped the horse.

P.C. NVR 115 'They probably worshipped the horse.'

D.H. NVR 106 'The horse ced of ben ther God.'

A.R. NVR 106 'I guess they worshipped the horse. Therefore it mit be their God.

Some children did make other suggestions, but these are not very searching:

C.J. NVR 133 'I think it is a sort of hobby.'

J.C. NVR 107 'Did they have it for a pet?'

N.L. NVR 104 'I guess it was a big ornament.'

J.W. NVR 122 suggested it may have been a kind of war memorial, but since two other children shared this idea it was probably a received idea.

The experimental groups' ideas seem more thoughtful and varied.

N.H. NVR 105 suggested that 'if they left things there for a goddess we might find the same things they left.'

P.K. NVR 105 thought it might be 'preostorick and carved out of chalk to frighten spirits away.'

S.H. NVR 104 said that 'upside down it looks like a bird' and they might have told it to 'fly out and bring a good harvest. They maybe thought it could come alive.'

A.W. NVR 128 thought that 'horses might be buried there and we could find their bones.'

G.P. NVR 133 thought that 'this could have been where they trained their horses and there might be remains of stables there.'

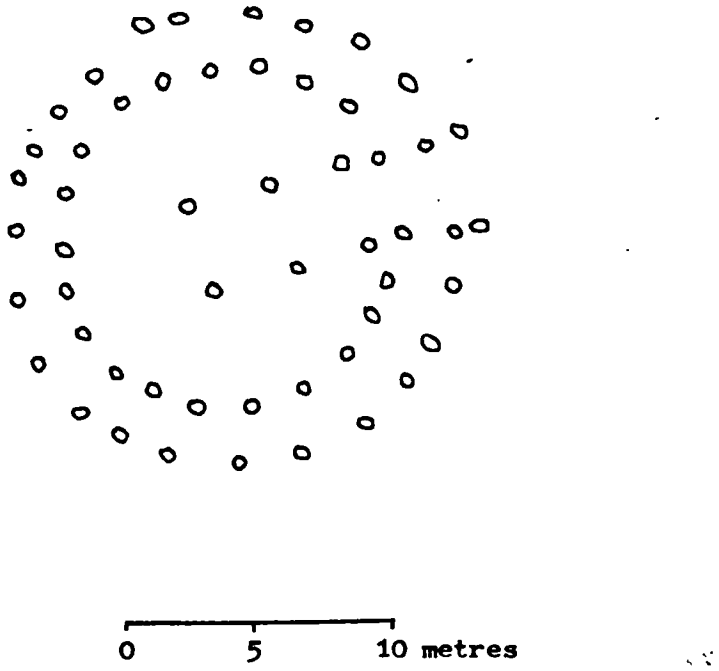
Because of their fertility of reasonable ideas about how the horse was made and what it may have meant to the people who made it, the experimental groups seem more able to see the evidence from another point of view. It is particularly important that children brought up in a Western culture learn to do this in order to respect the values of other societies, a point stressed in the World Archaeological Conference in 1986. There are Indian boys in the control and experimental groups, both with NVR scores of 130. It is interesting that M.H. in Exp. Group 2 was learning to switch values and attitudes. In Unit 1, Test 4, he wondered whether water was scarce and so measured by the Stone Age people on the hill top, and he was quoted in this test discussing the abstract design of the horse. By contrast, B.P. in the control group seems to find it difficult to believe that pre-history exists in the British Isles! He asks "Where was the Stone Age carving found, because nearly everything is made in factories" !

If children are not learning to switch viewpoints, this prevents them understanding sequence or change. In this test, there were references to 'cave-men' and 'The Stone Age'. It also encourages sex stereotyping. This test provided an irrelevant example in the control group.

J.W. (Qu. 2 level 6)

'I guess the Iron Age women were very careful with their cooking'

Test 3 Diagram of the Iron Age House at Little Woodbury



Plan of an Iron Age house at Little Woodbury, Wiltshire, excavated by Bersu in 1940. The plan is found in 'The Iron Age in Lowland Britain', D. W. Harding, R.K.P. 1974.

Although the range and originality of answers is not entirely reflected in the evidence scores, the fertility of ideas found in the experimental groups' answers probably accounts to a large extent for their higher levels of deductive reasoning shown in the graph on page 189. Wallach and Kagan (1965) found that a child's ability to generate unique and plentiful associates in a generally task-appropriate manner is independent of traditional I.Q..

Analysis of answers in test 3 again suggests that it is historical imagination - the disposition to consider a variety of possibilities - which enables children to consider the evidence from the point of view of people at the time, how it may have been made and used. The control group answers again show anachronism, sex-stereotyping. and a tendency to fit given information to the evidence, rather than take the evidence as the starting point.

In the control group B.P. (NVR 129) asked 'what did they do in their spare time, because they did not have guns'. C.J. (NVR 133) said 'if they didn't like caves, why did they live in them?', and J.W. (NVR 122) thought the walls 'were probably brick as a protection against animals'. P.C. (NVR 115) said 'they may not have gas or electricity'. S.J. (NVR 127) thought 'the men built the house and the ladies thatched the roof', and T.W. (NVR 107) thought 'the women told the children to make the fire'. Eleven children said that there must have been a fire in the middle of the hut, and seven of them went on to say that the roof must have been thatched with a hole in the centre for the smoke; presumably they had been told that this was true of Iron Age huts, although there was no evidence to support it in this diagram.

In the experimental groups, M.F. (NVR 129) said that 'since the home was made of different materials, people needed a variety of skills'; A.W. (NVR 128) wondered if they sharpened the posts to make them go in more easily, and said that 'since there were two rows of posts this may have been the chief's hut, and more people lived here'. M.H. (NVR 135) suggested 'the double row of posts may mean a storing compartment, or a secret compartment between two wattle walls, where they could hide and listen for attackers'.

S.W. (NVR 102) thought it may be a sleeping chamber which showed that they had a separate place to sleep. R.F. (NVR 105) thought the post holes inside might have been to hold the roof up, and K.G. (NVR 99) wondered if the children played around the posts. N.H. (NVR 105) thought they may not have lived in the hut but used it for grain storage, and that they might store some of the grain as an offering to a goddess. M.L. (NVR 102) said that if they did have a fire, they could 'warm up their clothes', and R.D. (NVR 102) said that we could make a hut like that today, but we'd have to find 'the right stuff first'. R.L. (NVR 107) said 'we don't know what tools they used'.

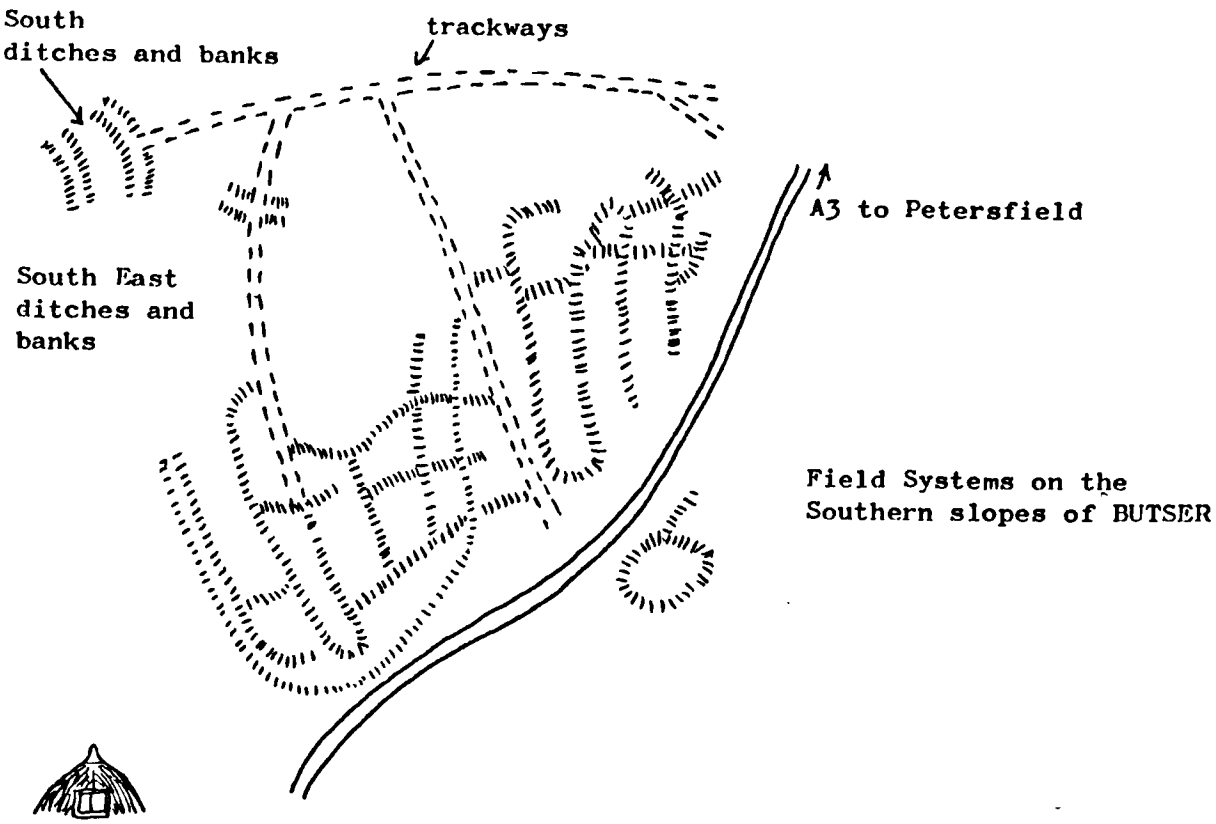
The experimental children are imagining how the house was made, and used, and what it meant to the people who lived in it. In order to do this freely, they have switched viewpoint.

D.F. (Exp 2, NVR 120, level 10) is an example of how logical argument and an awareness of time and the nature of change combine to produce creative thinking, which constitutes real historical problem-solving.

Question 1

they could make huts	they had tools, or special tools just for building	they must have designed tools using metals and done experiments to see which materials were damp when it rained
they knew what materials to use	they knew which materials would let the water in	

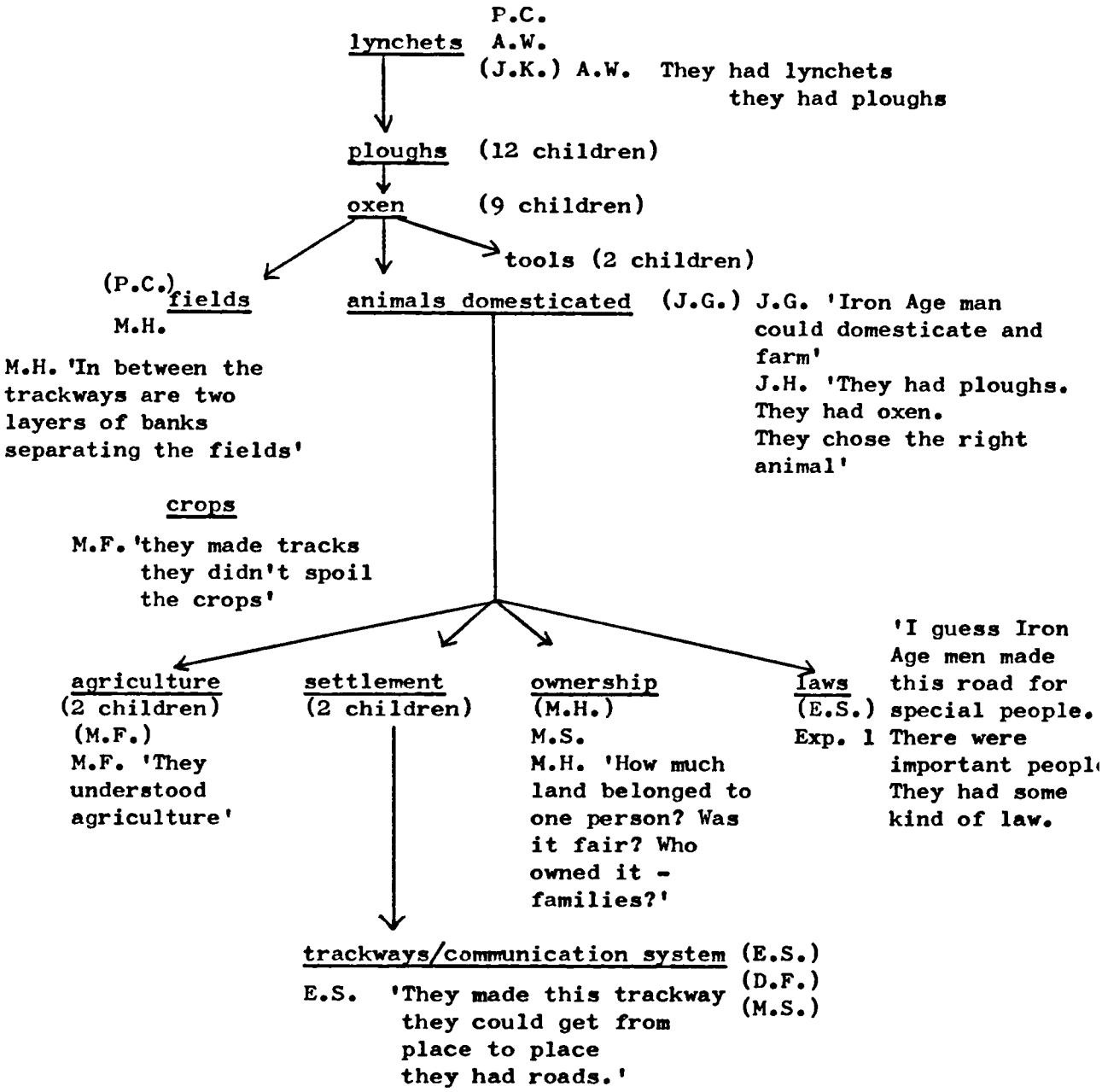
Unit 2. Test 4. Map of Celtic Field Systems on the Southern Slopes of Butser



Analyses of tests 1 - 3 in Unit 2 have shown the thinking which lies behind the experimental groups' written responses, and how more imaginative interpretation of evidence is developed through open-ended discussion. In analysing Test 4, we shall examine the ways in which the experimental groups were able to transfer the evidence given in a map of Celtic fields to their experience of a visit to a similar site on Farthing Down, then relate this to class discussions (in lesson time) of evidence about Iron Age farming. This demonstrates how concrete experience, followed by planned discussion, can be transferred to interpret new abstract evidence.

In their written answers, experimental group 2 developed between them many of the arguments inherent in this evidence, which showed lynchets and trackways.

Diagram 2 (a)



The table below shows how six children, in the written answers to test 4, related the Butser map to their experience of lynchets on Farthing Down, then to other evidence of Iron Age farming discussed in class, and finally added their own ideas

Table (e)

Butser Map	Farthing Down Visit	Class Discussion	Own Ideas
P.C. There are bumps. We know where the fields were	They could use machinery like a plough. They farmed. They grew crops	There was probably a settlement there. They probably grew vegetables (re: evidence of beans, vetch, crop rotation)	If they thought the horse was a God or something why did they not use it? (in farming)
J.G. They had ploughs	They understood how to grow crops. They could farm and domesticate	There might be tools or there might be bones of oxen still there. (re: evidence of bones found, and tools, at Glastonbury) (re: oxen bones similar to modern Dexter)	A cart could carry crops from the field How long did it take to make (invent?) a cart? If there are bones there, archaeologists could make up an oxen like they make dinosaurs in the Natural History museum
R.F. I know for certain this map gives us clues. I know some people can find these ditches (i.e. I know they exist and what they look like)	I guess they had patterns in soil and chalk. (i.e. I know soil or chalk is thin - viz the Uffington Horse)	I guess they had lambs (re: sheep probably Soay, as at Butser) or as J.K. said 'sheep would give wool and meat and keep the grass down	
M.S. They had fields. They must have had a plough	I guess the tracks were for taking the plough across	They might grow things like peas and beans (re: Butser evidence)	I guess the tracks were made of wood. There must have been timber to make them from. I would like to know what transport they had, and we would know what skills they had

/table continues....

Table (e) continued

Butser Map	Farthing Down Visit	Class Discussion	Own Ideas
S.K. They had roads	They could take the oxen across to another field because if the plough went over the corn it would crush it up and it would not grow again	I think they had a field of herbs (re: discussion of flavouring and preserving	They could eat them and (use them to) make other foods
M.H. In between the two trackways are two layers of banks separating the fields	They must transport the plough through gaps in the banks	The blank bits might be for settlements (re: post hole evidence)	Maybe the owners might live there. Maybe ownership separated by trackways. I would like to know how much land belonged to one person; if they had the same amount and if the lived in families next to each othe

Unit 2 Test 5 Strabo Written Evidence

Kathy Sylva (1980) found that children solved practical problems best through discussion of direct experience. This interaction was traced in analysing Test 4. Nevertheless, history is often dependent on written sources interpreted though discussion. In examining responses to Test 5, the role of language will be studied when it is not related either to a concrete artefact, a graphic image, or a visit.

Although the 'written' evidence in Unit 1 was petroglyphics, and in Unit 2 was a translation from latin, both experimental groups improved, while the control group did less well than in Unit 1. There seem to be three reasons why the experimental groups did as well on the written evidence test as on the other tests, and why they did much better than the control group, even judged solely on the grounds of levels of argument; all three are concerned with defined linguistic aims in the teaching strategies used. Firstly, they had been taught specific concepts (many of which recurred from the Stone Age unit) and they used the abstract vocabulary and the superordinate concepts in discussion; this enabled them to develop ideas further. Secondly, they had learned sequential discussion from specific evidence, and so did not rely on stereotyped information. Thirdly, the experimental groups had learned from the Stone Age unit discussions about the origins of communication, to consider language as an objective tool, its development and function, in the way that Margaret Donaldson showed to be so necessary. Each of these three aspects of language will be dealt with in turn, illustrated by examples from the children's answers.

(a) Concepts

The bar chart (2.2) shows that the experimental groups used many of the taught concepts from Unit 1 as well as Unit 2, in their written and taped answers, while the control group did not use one of them. Between them, they used such abstract vocabulary as: community, society, transport, power, money, ownership, and agriculture; seven of them used the word 'domesticate', and nine wrote 'trade'; they also wrote about 'settlement', 'inventing', 'tools' and 'weapons', first learned in Unit 1. Yet the influence of taught abstract concepts is not mainly seen in the number that are specifically used, but in their subordinate ideas which the experimental groups discussed in their answers - ideas about trade, agriculture, metal production and social structure. These ideas often stem from information previously learned in class discussion, as part of the argument, rather than as a didactic statement.

The control group answers are also concerned with trade, agriculture, metal production and social structure and some of their supposals are perceptive and relevant, but usually they either restate the information given, ask a question without suggesting an answer, or follow it with an idea which shows little understanding of change.

In discussing trade, in Exp. Group 1, I.W. says 'We know that Grece people traded with us...they must have had something to trade with', a reference to the quotation from Appian read in class, and S.H. guessed that 'They had boats...they knew how to control things'. In Exp. 2, three children refer, indirectly, to the reading from Diodorus Sicculus; F.F. (NVR 91) says we know that 'gold, silver and iron are all exported a cross the see' and guesses that 'I think they mitte of inventid whel to poosh'(i.e. they needed wheeled transport for bulk export!). M.F. wonders, apropos of Diodorus

Sicculus, whether one family, or place had a monopoly of exports 'who sold Strabo things? because they may have had one exporter, one person, or one family etc. - private exporters' and 'where Strabo bought things, because maybe there was only one shopping centre for England, one for Wales etc.' D.F. guesses that 'they knew what the difference was between two countries and they discovered that boats could go further than they thought...they made better boats and discovered about big boats could still float just as well'. As J.G. said, 'they could trade and build ship ports'. The control group did not discuss trade at all. There is no reflection on the organisation needed to buy, sell or transport goods. T.W. simply states that 'the dogs are exported' and F.S. that 'leather was exported'.

In examining the implications for agriculture of cattle and corn exports, N.H. (NVR 105) in Exp. Group 1 says that 'they had corn and cattle...they could farm and so had learned to live in one place. She guesses that they 'could have thatched roofs because of the corn' and that they might have had other animals as well. She wonders whether they also used farm dogs to keep the foxes and bears away. R.D. (NVR 102) in this group guesses that 'when they croosed ploued they mite croose ploue one way then another, as we sed pictars of people croose plouing and they mite have difrent plouse as they get ollder'. (He learned in class about cross-ploughing and imagines that this technique was used in corn production). In Exp. 2 both J.G. and M.H. note that 'by 100 BC, they have domesticated dogs and cattle. In the control group, four children make straightforward deductions about farming from the information that the Britons exported corn, cattle and leather goods. T.W. (NVR 107) says 'they got the leather from cows skin. I guess they kept oxen, cows and other things because they were useful' and D.H. (NVR 105) guessed that

since 'they grew corn and stuff, they grew other things'. J.S. says 'If they had a cow, the cow would give milk' and A.R. (NVR 106) thinks 'they used cows to pull ploughs'. B.P. (NVR 129) says that 'they got the leather from the cows which I think they got milk and meat from if they ran out', but his answer goes on to ask a question which shows little historical understanding: 'when they first came to the island, where did they get the cows from - say if they came from France, the Gauls might run out of them'. S.J. (NVR 127) simply says 'I don't know where they got all the things from and I would like to'.

In discussing metal production, D.F. (Exp. 2 NVR 120) said that since 'we know about the metles they had .... they must of made most of their tools out of metle and could shape hard things. M.F. (NVR 129) guessed that since they had gold, silver and iron, they had miners. He wonders how they mined it, and how they transported it, as he had seen neither mining tools, nor an Iron Age boat, in pictures. Control Group children do not consider tools, or transport, or the process of mining although in the control group, M.B. says that 'the people had gold and silver' which J.S. thinks 'was hard to find', and L.M. takes the idea a step further saying 'therefore they are dug up' and adds 'I would like some'. However, T.W. (NVR 107) does say that 'they might have had special people to make jewellery - because the women could not make it'

The experimental groups also reflect on a social structure which involved agriculture, trade and also slavery. M.H. (Exp. 2 NVR 135) thought the slaves might be used as 'translaters. If they export on a certain place the people who export might have to speak two languages...they might use the slaves to translate, and they might have to speak two languages'. C.L. (Exp. 1 NVR 122) considered the need for forward-planning in an agricultural society: 'I can guess

that it took months to grow the corn...they can look forward to eat it, and that they had a chief who might of had a torc round his neck'. I.W. (Exp. 1) considered whether they had developed job-specialisation: 'I would like to know if they took turns at each other's jobs, or if they just had one job...' In the control group, N.L. (NVR 104) simply says 'they catched slaves...they were lazy' although B.P. (NVR 129) suggests that the slaves did some work, such as ploughing and weeding and also 'helped' the enemy by telling them plans. However, the control group childrens' supposals about social structure do not lead to a switch of viewpoint because they are not rooted in the evidence, and take the form of unrelated questions; it is interesting that again they are interested in the roles of women and children.

T.W. asks 'how did mothers look after their children? They might be naughty'. C.S. asks 'did any women go to war because they might have done something like chopping wood, and did they have any schools?' L.B. guesses 'the children did not have much time to play', and F.S. (NVR 108) wonders 'how did the children survive the war? Did they do things men and ladies do? What things did they do?' It seems that when children have not learned the kinds of questions to ask of evidence, they are naturally interested in the lives of children.

(b) Sequential Argument

Because the control group had not learned abstract concepts through discussing their subordinate ideas, they were less able to develop a thought sequence based on these ideas. In the control group, there were only eight sequential statements (level 7 or 8) and no-one used a superordinate concept. In Exp. 1, there were twenty-six sequential arguments (level 7 or above) and four of these used a superordinate; in Exp. 2, there were twenty-nine arguments at level 7 or above, five

of them using superordinate concepts at level 9. Gradually, then, language strategies are enabling the experimental groups to produce a higher level of argument; teaching selected concepts is important in teaching children to make logical sequential deductions.

In analysing previous tests, it was also shown that the control group had been given didactic information, which made it difficult for them to develop their own ideas. This also affected the quality of their answers which were less varied and imaginative, and displayed anachronism, little understanding of historical change, and race and gender prejudice. Before this test, the control group appear to have been told that the Romans visited Britain, attacked in order to get their crops, and used Gallic slaves as spies; seven children repeated these facts often leading to good scores. However, 'therefore' frequently leads to an illogical second statement. J.W. (NVR 122) shows a lack of understanging of time and change 'the Romans could conquer Britannia and make slaves out of Britanniis...we could still be slaves today...the Romans could still exist'. It is not clear what J.W. means, but she seems to be wondering what it would be like if Britain was still part of the Roman Empire - an attempt at imagination, but not rooted in the evidence! N.C. similarly tries to make a sequential statement, but it is irrelevant and illogical 'I know it is level...they didn't get lost'. L.M. (NVR 136) on the other hand, starts with an irrelevant premise and tries to make sequential statements based on it. Qu. 1 'they never ran out of water...there was water in the ditches. How long did the ditches last? Because of the mud and slime it would crumble away'.

(c) Objectivity of Language

Thirdly, the experimental groups appear to be more aware of language as

an objective tool. In Exp. 1 this is illustrated by three children all with very low NVR scores. R.L. (NVR 107) recognises the importance of writing: 'the poepocemho rot it hoos name its his name was Strabo he cood rit and...god riters and readerse smart man'. (!) B.K. knows for certain that 'the man that did this was called Strabo, and it is book 1.4.2. so he must have been a wrighter'. She would like to know more about the book. G.B. (NVR 80)fortuitously explains that 'they was god at whiting; they all noow wat the wring ment'; he wonders 'how did they pant picts?' and assumes that pictures have been replaced by writing as a means of communication. He guesses 'they hatid doing pictures'. In Exp. 2, F.B. (NVR 125) guesses 'they could communicate somehow...they probably had a different language to us and communicateing was probertly important'. She wonders 'what their language was like'. J.G. (NVR 120) wondered 'how long after the Romans could Iron Age write?' D.F. (NVR 120) said that since 'foreign people could write in there own language, you knew what country a person came from'. A.W. (NVR 128) says that they had different language over different times. They did not have the same language every where. 'I guess they sometimes got confused. I would like to know how they made their languages up'. In the control group J.C. (NVR 107) also concerns herself with such ideas and wonders 'way did he went to be a write? wot wood he do instaint? Did he do inymoor of these. I think he did.' She wonders also if he was old, because 'he new a lot of things' and 'did he write net'. Apart from J.C (NVR 107), the control group had one child, M.B. (NVR 95) who stated baldly that 'it has been written by Strabo...it was written by a Roman' and another, J.W. (NVR 122) who 'would like to know how do we know what it says if it is Roman writing?' P.C. (NVR 115) shows little understanding of the achievement of writing: 'it tells me they could not write properly'. L.B. (NVR 119) seems to find the written evidence more difficult 'I would like to know why they did it in writing. It's harder. You don't know what to write'

None of the groups concerned themselves with questions of validity or bias - who was Strabo, why he wrote this, for whom, is it likely to be true, or is there any corroborating evidence?

Conclusion to Analysis of Unit 2

The experimental groups then seem more able than the control group to generate a variety of valid suppositions about how each piece of evidence was made and used, and what it may have meant to people at the time. This process enables them to begin to understand ideas, beliefs and social patterns of a society different from their own. It seems to develop mainly through open-ended discussion of evidence using learned vocabulary, although experience through visits to sites or museums, and reading historical novels is also helpful in nurturing historical imagination; and so developing empathy. This is an integral part of deductive reasoning about evidence.

B4 ANALYSIS OF THE ORAL EVIDENCE TESTS

Comparison of Content in Led and Unled Discussions

This table shows how in Unit 2, as in Unit 1, the content of the discussions was similar in both the led and unled groups. Again they consider how things were made, and why, and in doing so they discuss the significance and purpose of the objects to the people who made them. This is the way that Collingwood (1939) interprets evidence; in doing so, the children too have to try to put themselves in the position of the people who made and used these things, and so begin to envisage attitudes formed by an economic and social structure different from their own. This is the process through which Collingwood suggests that empathy develops.

In discussing the Waterloo Helmet, both groups discuss the processes involved in working metal, the social structure which would underlie an organised army, and the beliefs which might support it.

Test 1. The Waterloo Helmet. IBC. Slide B.M.

Led Discussion (Fxp. 1)	Unled Discussion (Fxp. 2)
HOW WAS IT MADE?	
'It's metal'	'They used the right kind of metal
'It's iron' 'or bronze'....	a mould and little rivets' 'They knew
'They knew how to smelt metal'	how to make it shine'
'There are patterns on it'	'They had the right tools'
'It might have had a leather strap'	'They could have traded for bronze or
'It's got horns'	iron'
	'It probably had straps on the side'
	'It's got horns'
WHY?	
Protection: 'In battles with other tribes - to capture land or cattle, if there was not enough food.'	'They fought near the River Thames'
'The horns are to look fierce, like an ox that could kill'	'Horns - like a goat, to butt enemies'

Ceremonial: 'For a chief to wear in a ceremony, not in war'	'Maybe it was an ornament for a chief'
To show rank: 'Those in helmets were the learners - or the other way round' 'It might have been a medal. Maybe there weren't enough for everyone or maybe some people didn't have such good minds' 'Maybe the more metal they had it showed they were higher up.	'There could be several kinds of helmets for awards in a battle' 'Awarded for extreme bravery in a ceremony' 'or in a contest for new warriors'
An offering to a God/Goddess: 'An offering to the water Goddess' 'It looks like a face from Dr. Who - maybe that's what they thought their God looked like'	'Maybe the pattern is special orders from their God' 'Or a magic helmet to help them in battle' 'Maybe they are symbols to their God and if there was a bad harvest they gave it as a peace offering.'

Test 2. The Uffington Horse. Photograph

In discussing the Uffington Horse, both groups consider the social organisation needed to create it, and the power it may symbolise over things beyond their control, and which they might fear: rival tribes, famine, illness, wild animals.

HOW WAS IT MADE?

Led Discussion	Unled Discussion
'They drew it and carved it in chalk near the surface' It took a long time 'probably centuries' and a lot of people. They were 'skillful', 'artistic', 'hard-working' - and 'a community'	'They must have been good drawers' 'There must be a lot of chalk there' 'Whatever they used they must have been able to dig down into the ground to get at the chalk' 'You'd need tools to draw it' 'It took a lot of time'

	'Maybe one group would stay and work on the horse, while the others were hunting and fighting' 'or maybe all the tribe joined in' 'It gave them something to do when they weren't doing anything'.
WHY?	
'It's not an ordinary horse. It's different from the horses we see' 'It looks like a bird' 'They went to a lot of trouble to make it' 'and looked after it' 'It may be a special spot'	'It doesn't really look like a horse. It's pale - not very clear' 'I couldn't draw that - no way!' 'People may think it's not much but probably it meant a lot to the Iron Age
'They might have used it as a kind of God' 'A symbol of strength' 'To protect them' 'They believed something had power over them' 'To scare away wolves from the sheep' 'To bring a good harvest'	'It was serious for the Iron Age people. 'It's probably a symbol - a clue - for something. Perhaps the hors was like a God to them. It could have given them power. (Perhaps they just did it for fun when they were bored) 'Perhaps they thought it was lucky' 'or they prayed to it if someone was ill' 'or to show off' 'or to scare off another tribe'
'They had ceremonies, customs, beliefs'	'It was probably done for ceremonies'

Test 3. Iron Age House plan. Little Woodbury

In both groups, the diagram prompted a much briefer discussion. Nevertheless, they both considered the materials used, and the implications of the house for social organisation. In this test, the unled group's attempt to imagine what

it meant to people at the time certainly took ~~for~~ the form of projecting themselves into the past: 'It would have been terrifying to live in a house like that' and 'probably they slept in deer, sheep, or buffalo skins; it must have been itchy!'

Led Discussion	Unled Discussion
HOW WAS IT MADE?	
'Postholes show the foundations' 'The posts held up the house' 'There are two rows of posts' 'There was probably wattle around the posts and a thatched roof' 'The wood came from trees' 'The thatch came from corn' 'They used tools' 'and transport to move the trees'	It is assumed it is made of wood: 'It could have been burnt down' and thatch: 'when it rained, water wet the straw' and it is thought to be found 'in hilly areas. The chalk would 'dissolve" water'
WHY?	
'They had shelter' 'Somewhere to live' so that they 'stayed' in one place' in a 'settled community' 'It was big - about half as big as the Junior Unit' 'So it may have been used as a meeting place 'or to do with a God'	'Probably the chief lived in the big house, and the willagers lived in small ones'

Test 4. Lynchets of Iron Age Fields, Butser

In discussing the map of Iron Age fields, both groups discuss how the fields were formed, and the suitability of the site, and the implications of farming, in creating a settled community, and an ordered, planned way of life. There are no flights of fancy in either of these discussions, and both groups employ their knowledge of the Farthing Down site to interpret this map.

Led Discussion	Unled Discussion
HOW WAS IT MADE?	
'The fields are different sizes' 'and shapes - mostly squares or rectangles' 'formed by lynchets, because of the way they cross-ploughed' 'linked up' 'bv trackways'	'Where the plough turned, and turned up the soil, it made a bank' 'There could be scratch marks where the plough turned' 'They used a celtic plough 'I'm pretty sure they used oxen to pull the plough. They've found the bones' 'The fields are on the side of a hill' 'to stop the wind' 'and you can'see' the rain falling down'
WHY?	
'They grew their own crops' 'Stayed in one place' 'In a settlement' 'a community' 'an agricultural society'	They realised crops are important' 'They must have realised you don't get crops every day' 'They must have learnt to save them, to store them' 'Without crops, they'd starve' 'They probably ate any old thing at the beginning, then they found the best types.
'Maybe the fields are individually owned according to rank' 'or maybe the blank area is a shared area where they could have a festival - where the track leads - or keep their plough or their weapons' 'or maybe they didn't plough there because the chalk was too near the surface or maybe there was a bad harvest - they moved on.'	'It's a good place to live. It's on a hill, and there's shelter away from the wind, like Farthing Down.'
'The ditches and banks may be to trap animals trying to eat the cattle' 'or for enemies to fall in!'	

1 (viii) Comparison of Structure in Led and Unled Discussions

Tables show the number of points scored at each level by the led and unled discussion groups in Unit 1, and in Unit 2. They were made from the synopses of tapes, recorded in diagramatic form as in Appendices XXVIII, IXL. These tables show that the led groups, in Unit 2, as in Unit 1, made more points at each level, and particularly at levels 7/8 and 9/10. However, the difference between the led and unled groups at these levels is less in Unit 2. It is also interesting that in both units the unled groups

Table (g)

		level 1/2		level 3/4		level 7/8		level 9/10	
UNIT 1		Led	Unled	Led	Unled	Led	Unled	Led	Unled
	Test 1	4	3	8	6	12	4	1	0
	Test 2	3	3	16	6	20	9	7	0
	Test 3	0	2	14	16	13	8	9	1
	Test 4	0	2	19	11	5	4	2	1
	Test 5	4	3	19	23	11	12	3	0
	Total	11	13	76	62	61	37	22	2
UNIT 2		Led	Unled	Led	Unled	Led	Unled	Led	Unled
	Test 1	4	1	26	11	17	20	3	0
	Test 2	3	1	15	17	14	8	15	14
	Test 3	0	5	10	6	17	4	5	2
	Test 4	0	6	15	20	21	3	11	0
	Test 5	9	0	18	7	11	11	6	0
	Total	16	13	84	61	80	46	40	16

do not make significantly more irrelevant or meaningless (level 1/2) points than the led groups.

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T ble (h)

	level 1/2		level 3/4		level 7/8		level 9/10	
Unit 1	11	13	76	62	61	37	22	2
Unit 2	16	13	84	61	80	46	40	16
	led	unled	led	unled	led	unled	led	unled

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B5 Analysis of the Empathy Test. Unit Two

In this test, the children were given a B.M. postcard of the Stanwick Horse mask (Appendix XXXV) and told to pretend they could go back in time into the Iron Age and write a story called 'The Tribe of the Horse'. The synopses of their stories show that the expected levels in understanding the values and attitudes of another society, which were suggested in Chapter Two, F2, were revealed.

/continued....

Analysis of Empathy Test. Unit 2. (Exp. 2)

Write a story called 'The Tribe of the Horse' about the Stanwick Horse-mask: pretend you go back in time, into the Iron Age.

Synopses of stories at Level 1 - Accidental (no significance)

R.L. 'A horse was lying wounded on the ground with a mask on him'

M.H. Describes a ceremony in which he is made chief; no reference to horse-mask.

S.W. Describes night-time dance - 'we do this every night' and 'haf something to eat' (no mention of mask).

Level 2. Matter of Fact. (Horse-mask mentioned in matter-of-fact way, stating a meaning for it, but with no attempt to understand why it was regarded in this way by the Iron Age people.

L.W. 'It is important to us because our chief wore it when he was alive, and this is his birthday'

R.F. 'The Horse tribe were putting a mask on the man's head, and praying to their God'.

K.B. 'They are doing a ceremony'

S.K. 'Ceremony for someone who has died. We went to pray at the God which was a horse'.

K.C. 'Every time the horse grows two years older, we have a ceremony. He is now 52 years old'.

Level 3. Detailed Matter-of-Fact. (More detailed description of the meaning of the mask, but no attempt to explain why it had this significance to Iron Age people).

M.F. Probably the 'sticking-out bits' were tied to a post or something and a ceremony took place, with dancing and singing to celebrate the birth of the chief's son. The horse mask hung over the entrance was to keep evil spirits away.

J.G. 'Praying to our God because there has been a drought; without food and water we shall die. Plants die. Animals can't find food and if they go away we shall have no food or clothes. We give our God gifts in this ceremony, and in return he shall give us our gift of food and shelter.'

D.F. Burning a horse and beating drums and wearing horse-masks; then all stop and pray. Chief had died and been burnt already. Burnt the horse too because he is their God, and they are praying to the chief and their God.

K.G. Tied me to a pole, facing a horse-mask, and set light to me. The horse has the power to fight evil tribes. I said I have done no harm and screamed. They let me go.

N.T. Ceremony. People clapping and dancing around a horse, and 'drinking some kind of water'. The ceremony is for a new horse. 'The water is to put the power into the horse. The drums are to warn the spirits and the clapping is to comfort the horse. The dancing is to tell the horse he is our God'.

Level 4. Restricted Historical Empathy. (Attempts to explain values and behaviour different from own, symbolised by horse-mask, and to question them and recognise that they are different).

M.H. 'The horse was the only one who had the experience to save them from Caesar and other people. The horse God is in the mask. With his help we remove the bad, and suffocate it in jars'. They were collecting something.

A.W. Burnt on right shoulder to join the tribe. I said, "Why is your horse your symbol?" He said, "He is alert." I said, "so are most animals." He said, "You're tricky...he was worshipped by our ancestors." I said, "Do you do everything your ancestors did then?' He did not like that so he went away.

F.B. 'The horse is a symbol of our God, because he is so strong and bold and fast.'

P.C. A ceremony. A man is being whipped, then hung, and the chief set light to the hay. An old wise man explained that he had been the best doctor, until he poisoned the powerful horse-God.

P.C. argues that the horse God may not have been poisoned deliberately, but as a result he is siezed by the people (i.e. he questions behaviour they take for granted as right).

(iii) Empathy Tests

The following table shows that there was some improvement in the empathy levels reached in the empathy tests in Unit Two. In Unit One, four children operated at level 1, and none at level 4, while in Unit Two, only two children were classed at level 1, and three at level 4. The children who in Unit One operated at the 'Matter of Fact Level 2' were writing more detailed stories by Unit Two.

Table (f)

NAME	EMPATHY LEVEL UNIT 1	EMPATHY LEVEL UNIT 2
R.L.	1	1
M.Hu.	1	1
S.W.	1	a
L.W.	1	2
R.F.	3	2
S.K.	3	2
K.C.	2	2
M.F.	2	3
J.G.	2	3
D.F.	2	3
K.G.	2	3
N.T.	3	3
M.H.	2	4
A.W.	a	4
F.B.	2	4

C. REASONS FOR OMISSION OF ANALYSIS OF UNIT THREE, THE ROMANS

Unit Three, The Romans, was taught to both experimental groups, using the integrated curriculum lesson plans and lists of concepts given in Appendices I-XII, and this unit was tested using evidence listed in Appendices XXIV-XXVIII and IXL. However, since analysis of the previous units had been extremely time-consuming and lengthy to record, it was decided to only analyse one more unit. Unit Three was omitted, partly because it seemed likely that the results of acceleration over four units would be seen most clearly in Unit Four, and also because it was felt that any marked improvement noticed in Unit Three could be attributed to the fact that children are more likely to have general knowledge about the Romans than about the Saxons, which might give misleading results.

Chapter Three

Findings

D Analysis of Unit 4. The Saxons

D1. Statistical Analysis

(a) Comparison of the written evidence scores of the control and experimental groups.

(b) Comparison of responses to the three types of question, within the three groups.

(c) Comparison of responses to the five types of evidence, within the three groups.

(d) Discussion of significant interactions.

D2. Concepts: analysis of concepts used by control and experimental groups in written and oral evidence tests, and by the experimental groups in the led and unled discussions.

D3. Analysis of written evidence tests, showing how control and experimental groups use previous knowledge differently in interpreting new evidence.

(a) Test 1 Artefact. Replica of the Sceptre. Sutton Hoo ship burial B.M. slide ML18.
Examples show how experimental groups relate the evidence to an existing framework of knowledge based on concepts relating to kingship, power and laws.

(b) Test 2 Picture. Illuminated manuscript showing harvest. B.M. Library slide, F 21985.
Examples show how experimental groups relate this picture to a framework of knowledge based on concepts of agriculture, community and communication.

/cont....

/cont....

(c) Test 3 Diagram. Plan of the Saxon Church at Cirencester. (Archaeology in Anglo Saxon England. Wilson, DM, 1976) Examples show how control and experimental groups go beyond the information given, but in different ways.

(d) Test 4 Map. Map of the Croydon Area in Saxon Times. Examples show control and experimental children misunderstand information in different ways.

(e) Test 5 Writing. Excerpt from Beowulf. Penguin 1973 lines 824-838. Examples show learned concepts (fear, courage, power, beliefs and vengeance) help the experimental groups to understand the symbolic meaning of the poem.

D4. Analysis of Oral Evidence Tests

Comparison of the Led and Unled Discussion Groups.

D5. Comments on the Empathy Test. Unit 4.

D1. Statistical Analysis

Unit 3. The Saxons

Table 9 ANALYSIS OF VARIAN E TABLE

SOURCE	SS	DF	1S	F
BETWEEN SUBJECTS	1669.80	59		
Main Effect A	318.28	2	159.14	6.71
Error for A	1351.52	57	23.71	
WITHIN SUBJECTS	2508.13	840		
Main Effect B	265.95	2	132.97	45.26
Interaction A x B	30.04	4	7.51	2.56
Error for B	334.95	114	2.94	
Main Effect C	8.93	4	2.23	0.61
Interaction A x C	76.82	8	9.60	2.63
Error for C	831.71	228	3.65	
Interaction B x C	17.82	8	2.23	1.19
Interaction ABC	90.89	16	5.68	3.04
Error for BC	851.02	456	1.87	
Total	4177.93	899		

As in the previous two units, the analysis used was a three-way repeated measures design (two between, one within). The classes were the first main factor (A); questions asked were the second factor (B), and the repeated measures factor (C) was the type of evidence. The complete design had 3 x 3 x 5 levels. The results are given in full in Appendix XLVI(vi).

(a) Main Effect A A comparison of the written evidence scores of the control and the experimental groups.

The null hypothesis that there is no difference between the groups is rejected

$$(F = 6.71 \text{ df } 2, 57 < .05)$$

The Sheffé test for multiple comparison showed significant differences between the means for the control group, and the experimental groups.

(a_1) vs (a_2) $F^1 = 7.5$ sig

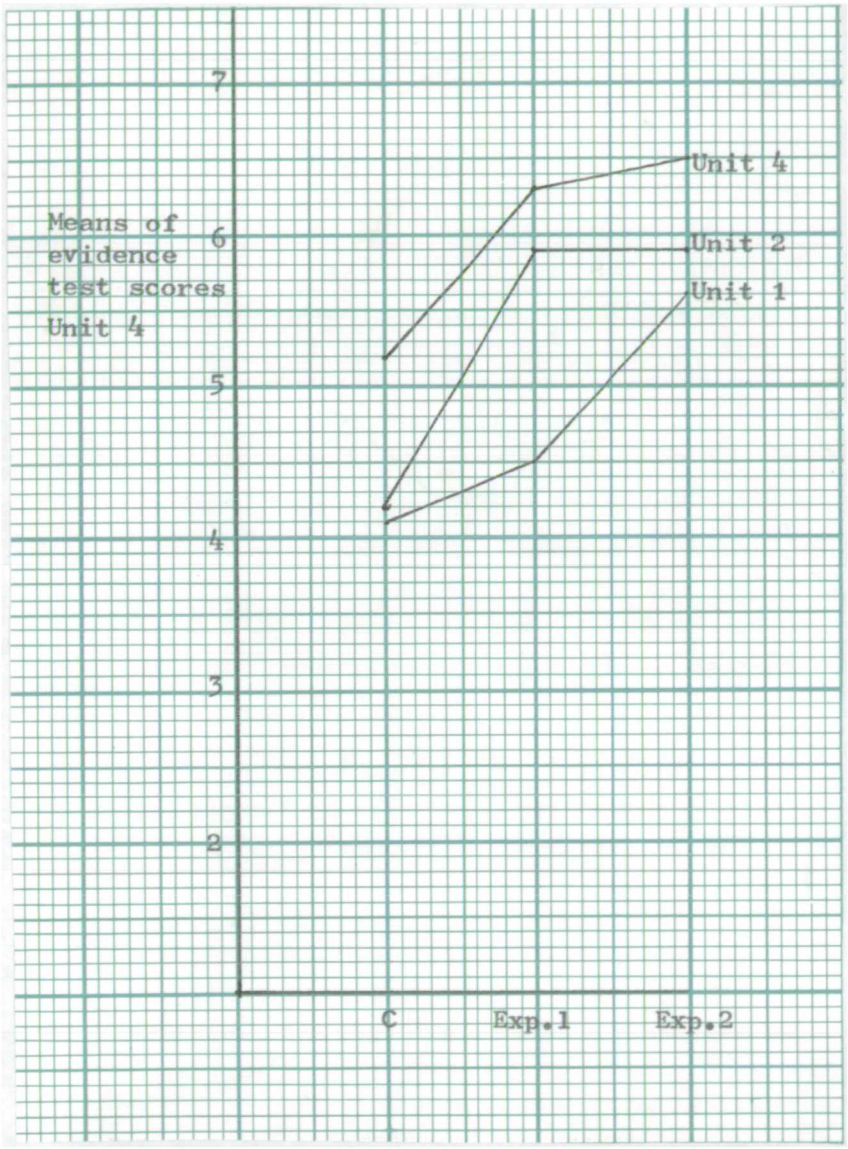
(a_1) vs (a_3) $F^1 = 10.7$ sig

(a_2) vs (a_3) $F^1 = < .01$ n.s

The graph (Fig 3 (i)) shows the means of the evidence scores for the control and experimental groups for Unit 4 and also for Units 1 and 2. It is interesting that the means for all three groups are higher in Unit 4; the control group seem to have (to a degree,) learned) the thinking processes required by the test, irrespective of teaching strategies. However, the mean for the experimental groups is markedly higher than for the control group. The experimental group 1 have improved considerably; their scores by the end of the course are above those of the control group, and almost equal to those of experimental group two, in spite of the behavioural difficulties of this group, mentioned earlier.

As in the previous two units, the main effect A (classes) and B (questions) were significant. As in Unit 2 main effect C (evidence) was not significant. Plots of the means for main effect A for units 1, 2, and 4 (Fig 3 (i)) show that each of the groups had improved, probably partly because of increased maturity and experience of doing this form of test. Experimental group one improved tremendously, although never quite progressing at the level of experimental group 2. They improved markedly between Units 1 and 2, (possibly as they got used to the requirements of a new teacher!). Experimental group 2 made steady progress. The means for main effect B are parallel for all three units, showing question 2 to be slightly harder than question 2, and question 3 to be by far the most difficult. Means for main effect C show a gradual levelling out across the five kinds of evidence over the 4 units. The analysis of variance table (Table 9) shows significant interactions which will be discussed later.

Fig 3 (i) Graph showing means of scores for history evidence tests for control and experimental groups, Units 1, 2 and 4



(b) Main Effect B A comparison of responses to the three types of question within the three groups: question one: 'what do you know for certain?'; question two: 'what reasonable guesses can you make?'; question three: 'what would you like to know?'

The null hypothesis that there is no difference between the questions is rejected

$(F = 45.26 \text{ df } 2, 114 < .05)$

The graph (Fig 3 (ii)) shows that the trend revealed in Unit 1 continues. The children find it slightly harder to make guesses about evidence than to make certainty statements. They find question three (what would you like to know?) the most difficult, but they cope with it more easily than they did in the first unit.

The Sheffé test for multiple comparison showed significant differences between the means for question 1 and question 3 and question 2 and question 3, but not between the means for question 1 and question 2.

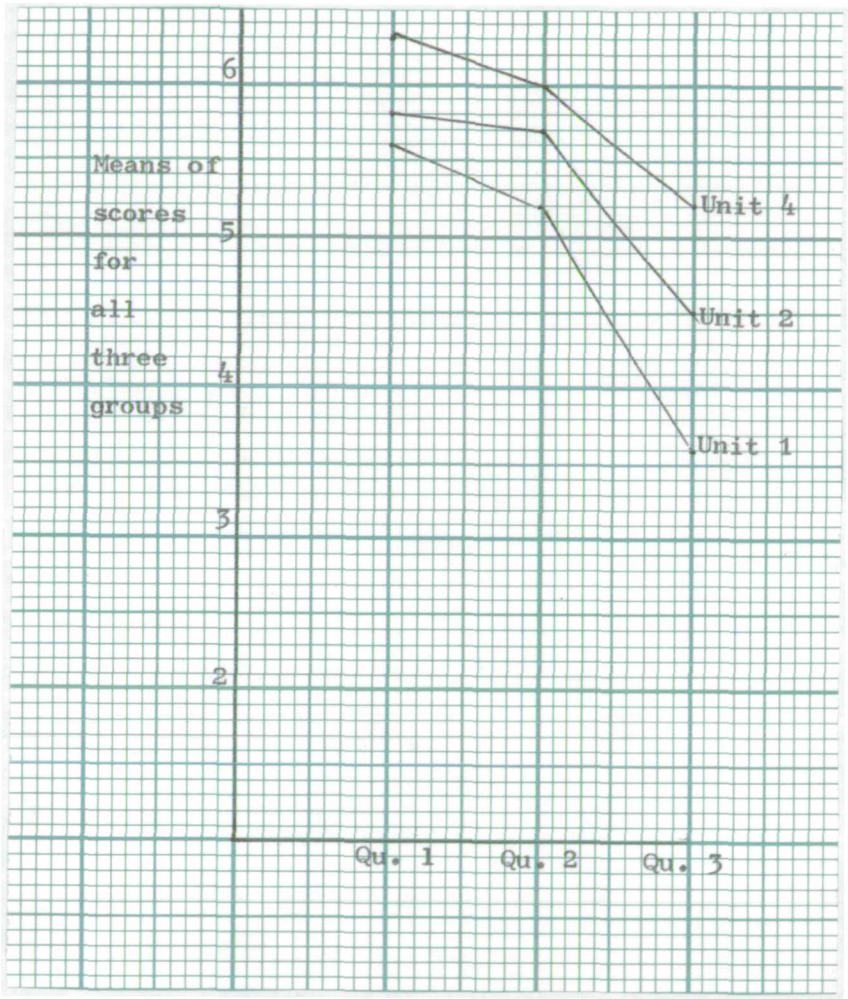
(b_1) vs $(b_2) = F^1 = 2.04$ n.s

(b_1) vs $(b_3) = F^1 = 56$ sig

(b_2) vs $(b_3) = F^1 = 7.96$ sig

In Unit 1 there was a difference of two marks between the means for question one and question three; in Unit 4, there was only a difference of one mark. By Unit 4, they can answer question 3 at the same level as they answered question 2 in Unit 1.

Fig 3 (ii) Graph showing means of scores for each type of question for all three groups Units 1, 2 and 4



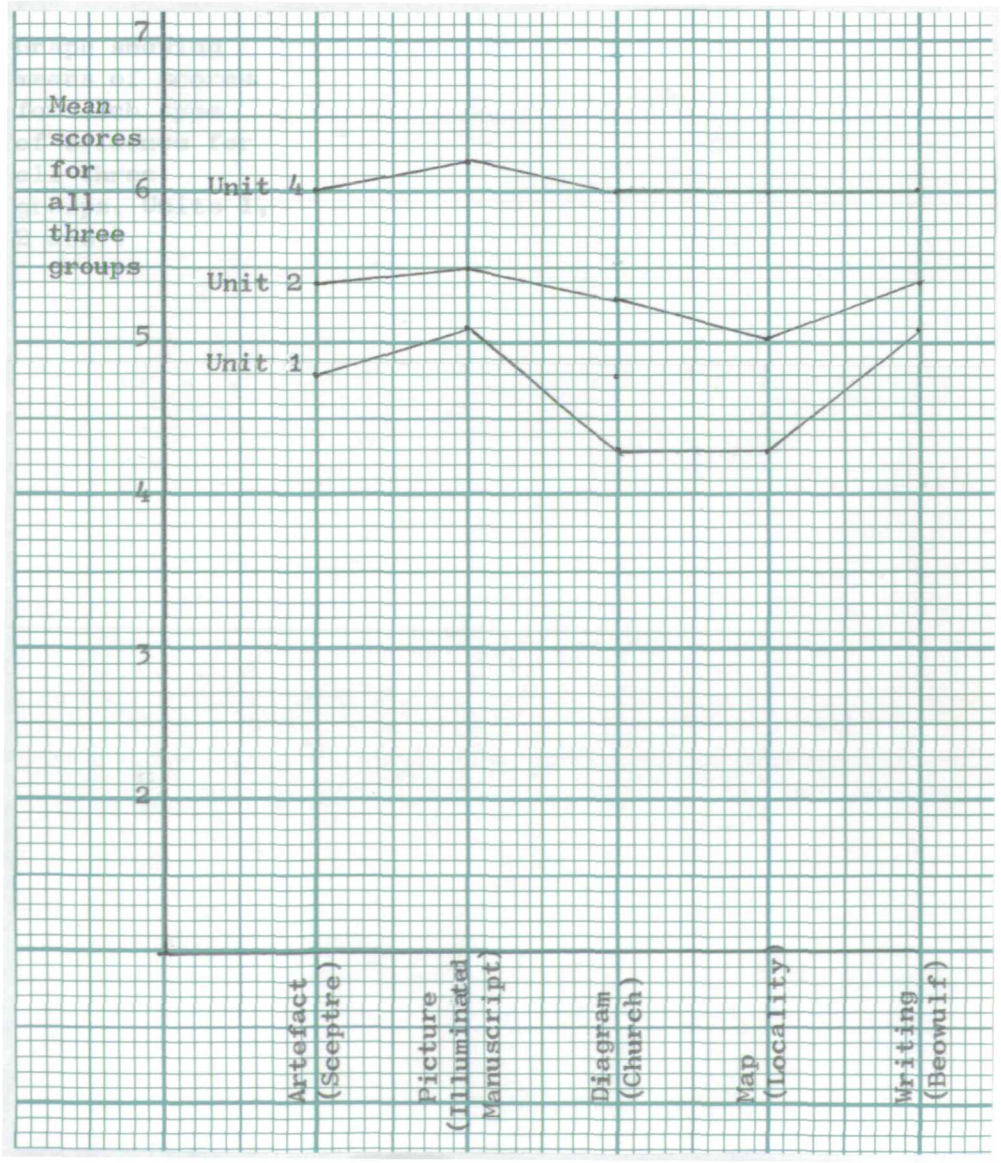
(c) Main Effect C A comparison of responses in the five types of evidence within the three groups.

There is no main effect for C (F = 0.61, df 4, 228, n.s)

As the graph (Fig 3 (iii) shows, there is no significant difference in the children's ability to interpret different kinds of evidence, by Unit 4. As in Unit 1, they found the picture slightly easier, but by Unit 4 they had learned to cope with the abstract evidence (the diagram, map and writing) as well as they could with the artefact. This is almost certainly because all historical evidence is equally abstract and is meaningless until it is interpreted. Language is the tool for interpreting any kind of evidence. If children have learned to interpret concrete evidence, and also to relate abstract evidence - a diagram or a map - to direct experience, or pictures, then they can discuss abstract evidence as well as concrete evidence.

Fig 3 (iii)

Graph showing means of scores for each type of evidence for all three groups, Unit 1, 2 and 4



(d) Discussion of Significant Interactions

The analysis of variance table (Table 9) shows that significant interactions occur for BC (questions and evidence).

($F = 1.19$ df 8, 456 $p < .05$)

for AC (classes and types of evidence)

($F = 2.63$ df 8, 228 $p < .05$)

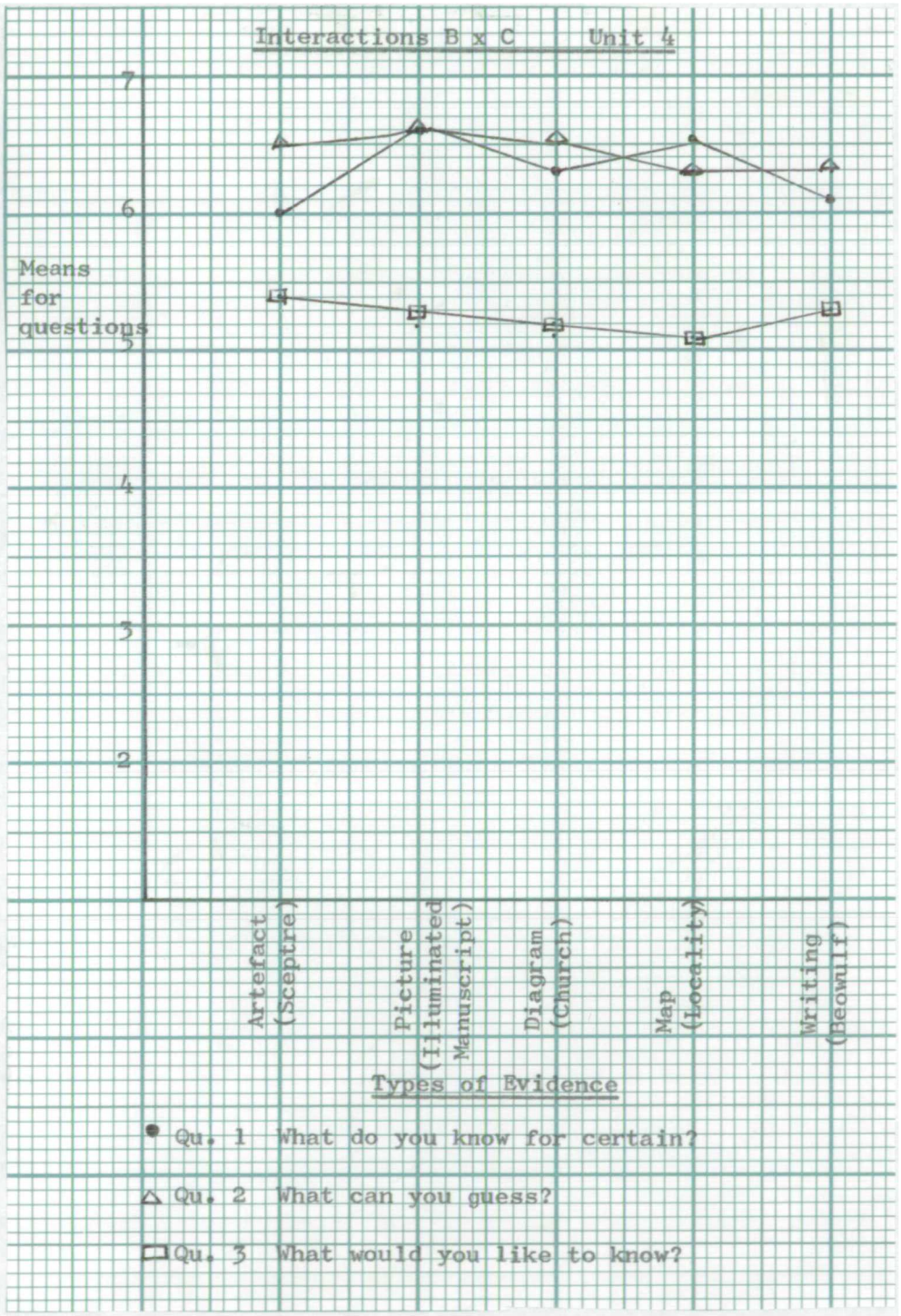
and for AB (classes and questions)

($F = 2.56$ df 4, 114 $p < .05$)

B x C

The graph (Fig 3 (iv)) reflects Main Effect C; there was, by Unit 4, not much difference in the way the children coped with each kind of evidence. They found question three hardest for each type of evidence, and there is a parallel tendency between questions 2 and 3; there is a very slight increase in difficulty from the artefact to the map. The interactions between questions 1 and 2 show that knowing and guessing are similar processes; there is often overlap, and grey areas between them. It is difficult to know much about how the sceptre was used in Anglo-Saxon times or what it definitely signified; the experimental groups may have 'known' more about the map because they had visited an area of Saxon settlement. None of the groups had visited a Saxon church, so they would not know much about the church plan. There is little certain evidence in Beowulf. This graph then shows firstly that by Unit 4, the children could cope equally well with each type of evidence, and that there is little difference in difficulty between knowing and guessing, but that question 3 (what would you like to know?) is equally difficult whatever the evidence.

Fig 3 (iv) Graph showing interactions between means for questions and types of evidence for control and experimental groups. Unit 4

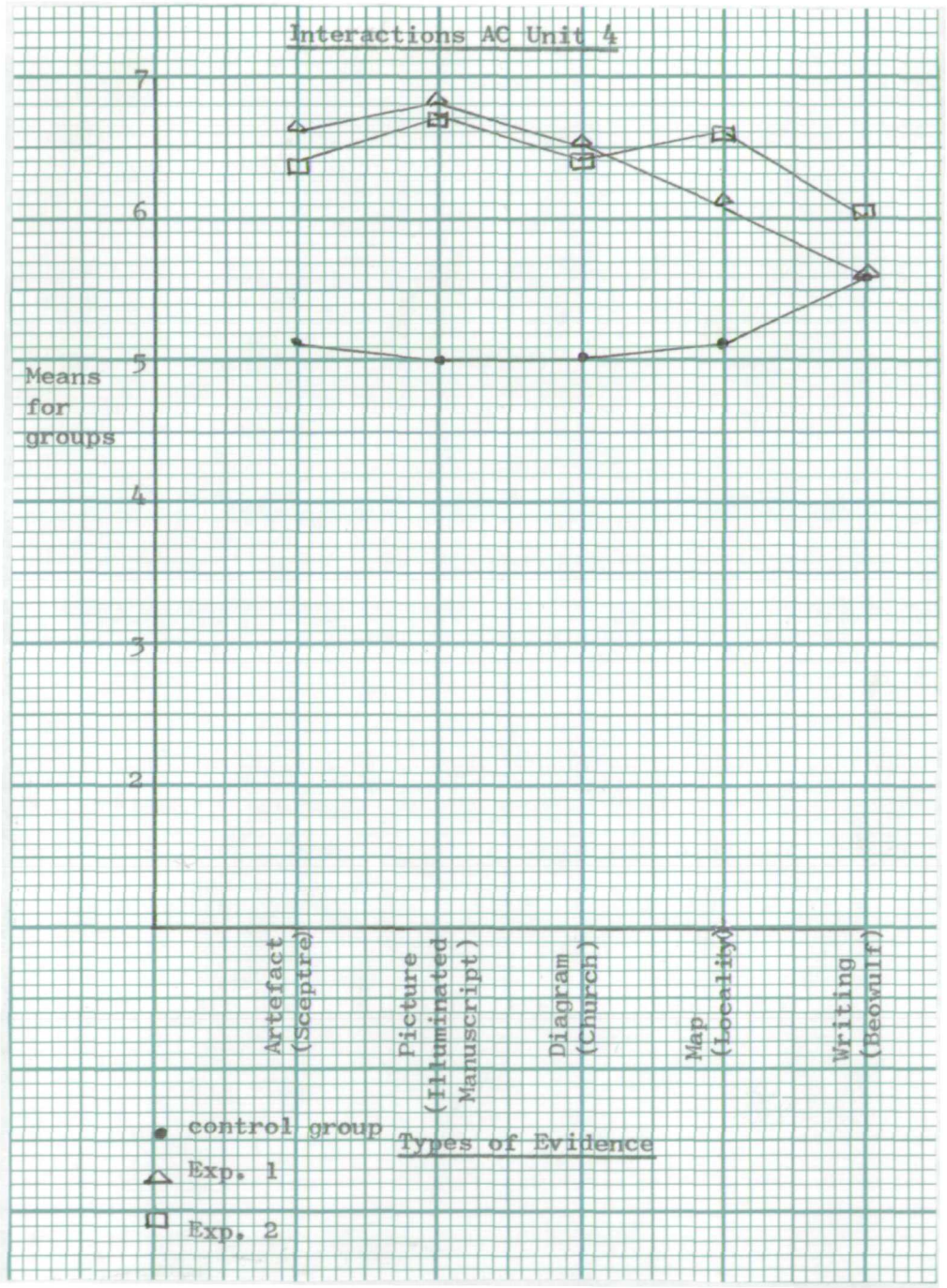


A x C

Main effect C showed that by Unit 4 the children found it equally easy to interpret each kind of evidence. The graph (Fig 3 (v)) shows that the slightly higher scores for the picture are accounted for by the experimental groups. It is interesting that by Unit 4 experimental Group 1 actually did better than experimental group 2 on the first three tests - a considerable improvement on motivation and performance during the 4 unit course! Experimental group 2 did slightly better than they did on the map question - possibly because the visit had been better planned on the second occasion. They also did slightly better on the Beowulf question - maybe because they were a more reflective class who enjoyed stories.

The level main effect across the five kinds of evidence resulted from opposite trends across the experimental and control groups, but the span was only across one mark. It is very likely that the control group found the Beowulf extract easier to interpret than the other evidence because they had not learned how to interpret historical evidence, but they had plenty of practice in comprehension exercises, which the experimental groups had not had.

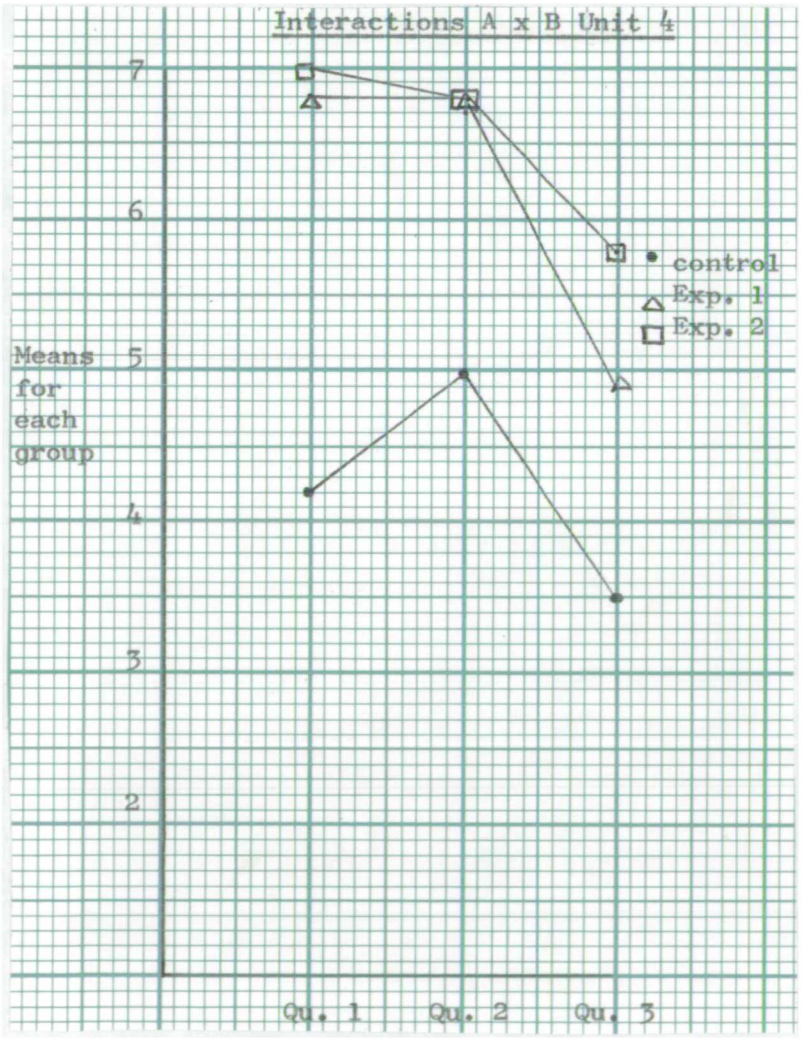
Fig 3 (v) Graph showing interactions between groups and types of evidence, Unit 4



A x B

Main effect B had found a trend of increasing difficulty from questions 1 to 3. This is reflected in the graph (Fig 3 (vi)) for A x B interactions except that the control grou found question 2 much easier than question one. This exa rates a tendency in Unit 1. It may be because they had been given very limited didactic information but had not learned how to make their own deductions about evidence. Therefore, the only certainty statements they made were usually a repeat, without development of the limited information they had been given.

Fig 3 (vi) Graph showing interactions between means for groups and each type of question Unit 4.



D2. Concepts. Discussion of concepts used by Control and Experimental groups in written and oral evidence tests

The following bar charts show the selected concepts taught in Unit 4 which were used by children in the written and oral evidence tests. As in Units 1 and 2, they are divided into three levels (listed in Appendix VIII) which were discussed in Chapter One. However, it was shown that hierarchical levels are often not clearly defined, and many concepts can be categorised at several levels. Rosch et al (1976) found that similar attributes may be listed for different categories, especially at the lower levels. This may be because people store information about specific instances, as well as a prototype (Posner & Keelie (1968)). For this reason, 'boast' and 'monks' were listed at a concrete level because, as the lesson plans show (Appendix XII), children were introduced to specific examples of these concepts: the boast was that Beowulf could kill a monster, and the monk was St. Augustine. Ornament was classified as superordinate because in lesson four, ornament and decoration were discussed in more general terms, as applied to Celtic crosses, church buildings and manuscripts with little reference to particular examples.

Bar chart 3.1 records each time a child in the control or the experimental groups used one of the taught concepts (on one or more occasion) in a written evidence test. It shows how, as in Units 1 and 2, the children in the experimental groups used the concepts they had learned, particularly at the lower levels, while the control group used little specialised vocabulary.

Bar chart 3.3 shows that the experimental groups also retained, as part of their own vocabulary, concepts learned in Units 1 and 2 and

used them, when relevant, in their written answers in Unit 4. Seven concepts learned in Unit 1 were used in written answers in both Unit 2 and Unit 4: chalk, weapons, tools, hunt, invent, symbol, vegetation. Nineteen concepts learned in Unit 2 were used in answers in Unit 4. This suggests that the selected taught concepts were becoming part of the childrens' own vocabulary. The control group used hardly any abstract concepts.

Bar chart 3.2 records the concepts taught in Unit 4 used on one or more occasion in the led and unled discussions. It shows that both led and unled groups used some of the taught concepts and, as in Units 1 and 2, the led groups used slightly more that the unled groups.

It seems then that the control group children did not use specialised concepts because they had not been taught them. Children in the experimental groups on the other hand were able to retain them, relate them to new examples, and to use them in interpreting the significance of the new piece of evidence. It seems that at least some of these children had learned to abstract common characteristics of concepts such as chalk, weapons, tools, through discussion of specific instances. They were also able to formulate some kind of rule from specific examples which enabled them to use such words as symbol, power, vegetation and transport in a new context.

The central role of concept development is important in explaining the difference noted between the quality of answers of the control and experimental groups. Eysenck (1984 p. 314) says that "the categories we form guide our subsequent thinking and behaviour," and Rosch et al (1976) show that "the primacy of basic level concepts reflects

fundamental perceptual and cognitive processes." In analysing Unit 2 test 5, the influence of taught concepts was seen in the way experimental group children used them as organisers around which they explored subordinate ideas about trade and agriculture. In Unit 4, we shall see how learned concepts such as kingship, power, laws, fear, courage, power and beliefs give the experimental children a framework to which they are able to relate new pieces of evidence. Testing new examples against these concepts generates internal discussion, possibilities and questions.

It was suggested in Unit 2 that open-ended discussions enabled the experimental groups to offer a more fertile range of valid suggestions about how things were made and used, and so to develop an embryonic understanding of how people in the past felt and thought. It seems that the development of specialised and abstract concepts is a central part of this process.

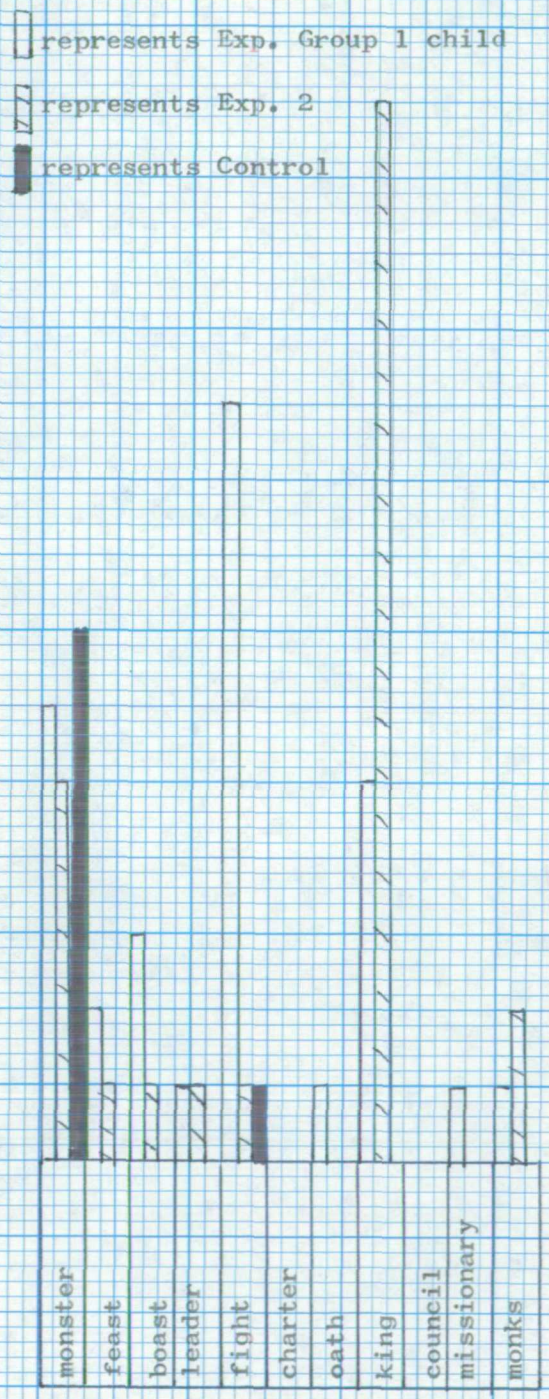
Bar Chart 3.1

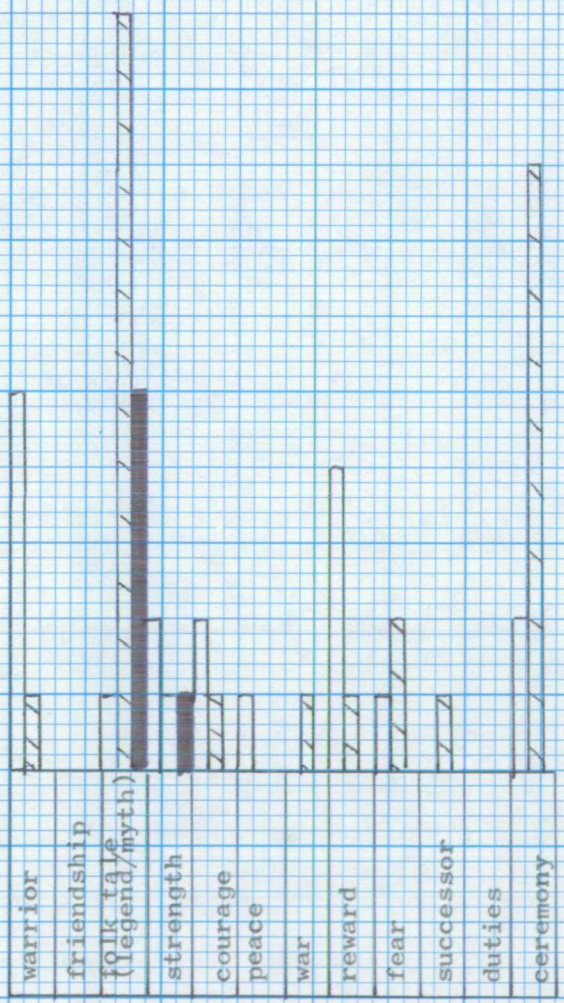
Taught concepts in Unit 4 used in written evidence tests.

This bar chart shows that (as in Units 1 and 2) children in the experimental groups used the concepts they had learned; they used concrete, abstract and superordinate concepts, although they used the superordinates less frequently. The Control Group children used few of these key concepts.

1 cm. represents 1 concept by 1 child correctly

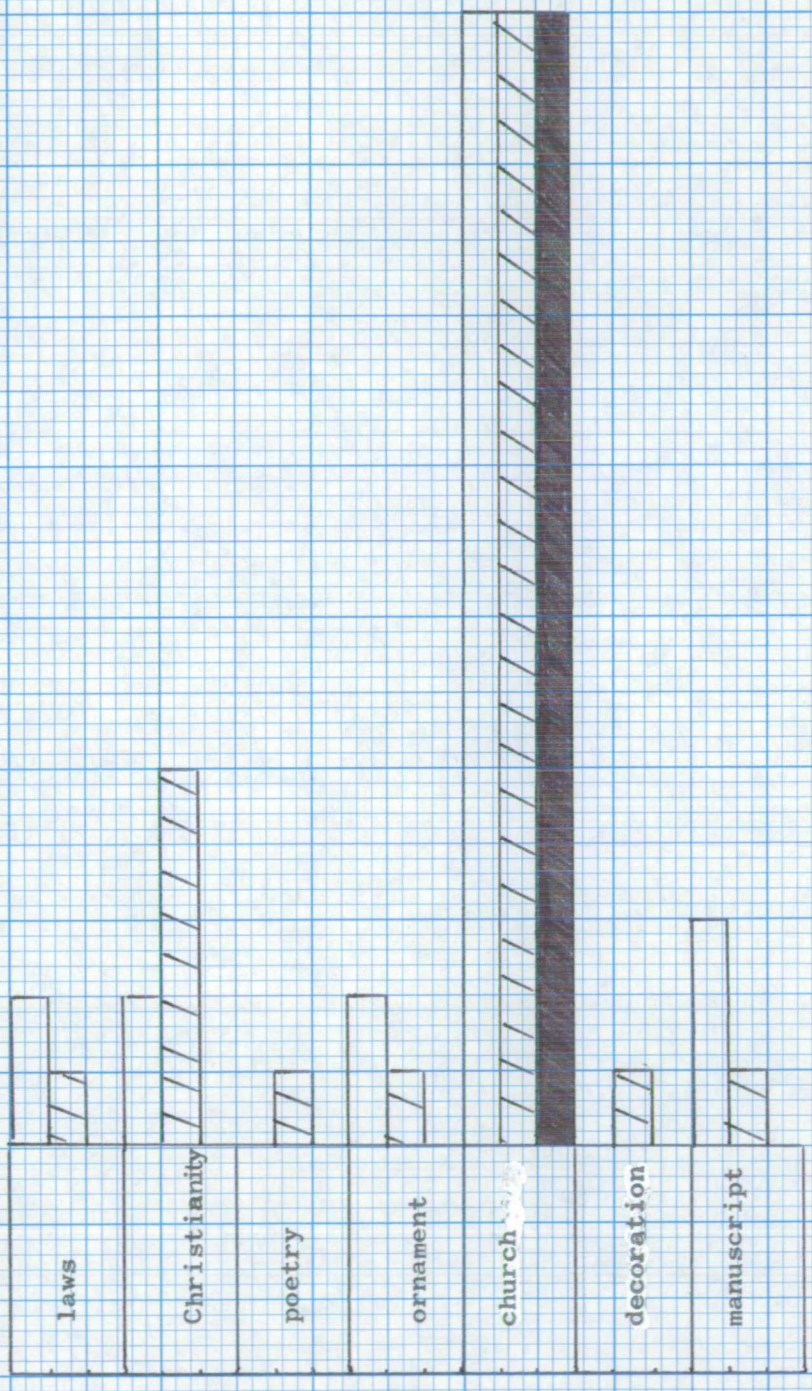
Concrete	Abstract	Superordinates
Exp. 1 29	Exp. 1 43	Exp. 1 11
Exp. 2 25	Exp. 2 50	Exp. 2 12
Control 8	Control 6 (+15-church)=21	Control 5



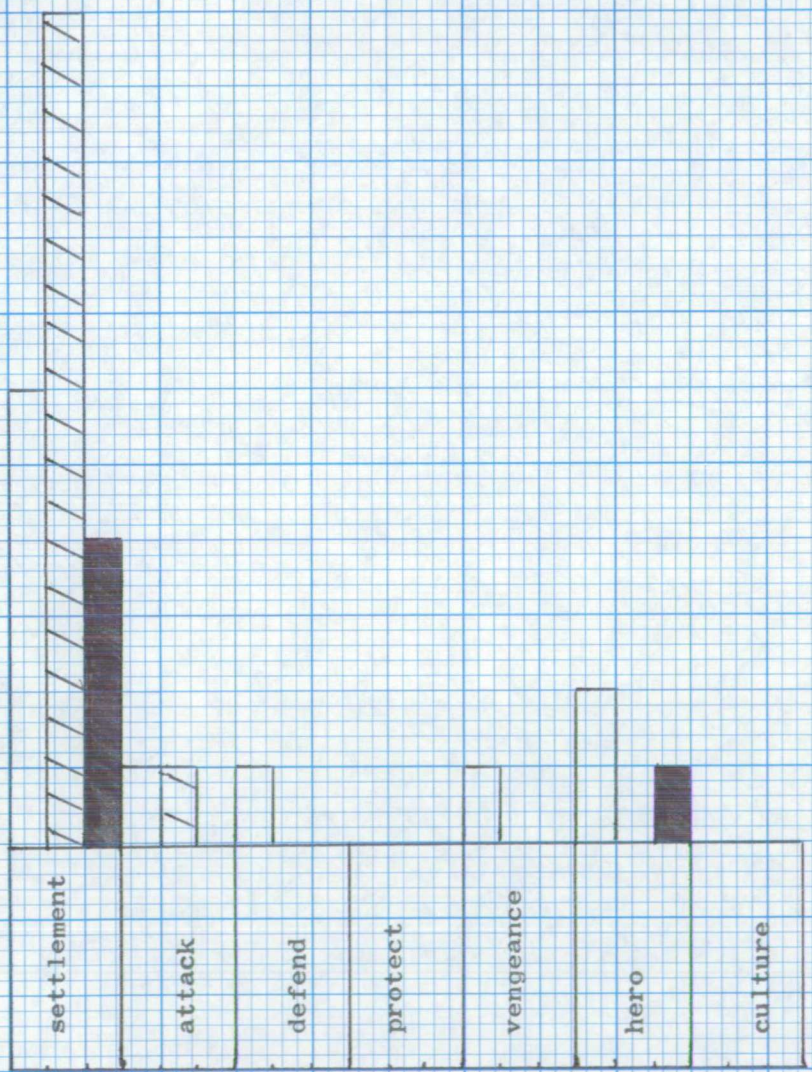

warrior
friendship
folk tale (legend/myth)
strength
courage
peace
war
reward
fear
successor
duties
ceremony
Abstract

Bar chart 3.1 continued/2

Concepts Unit 4



Superordinate Concepts. Unit 4



Bar Chart 3.2

Taught concepts in Unit 4 used in discussion tapes.

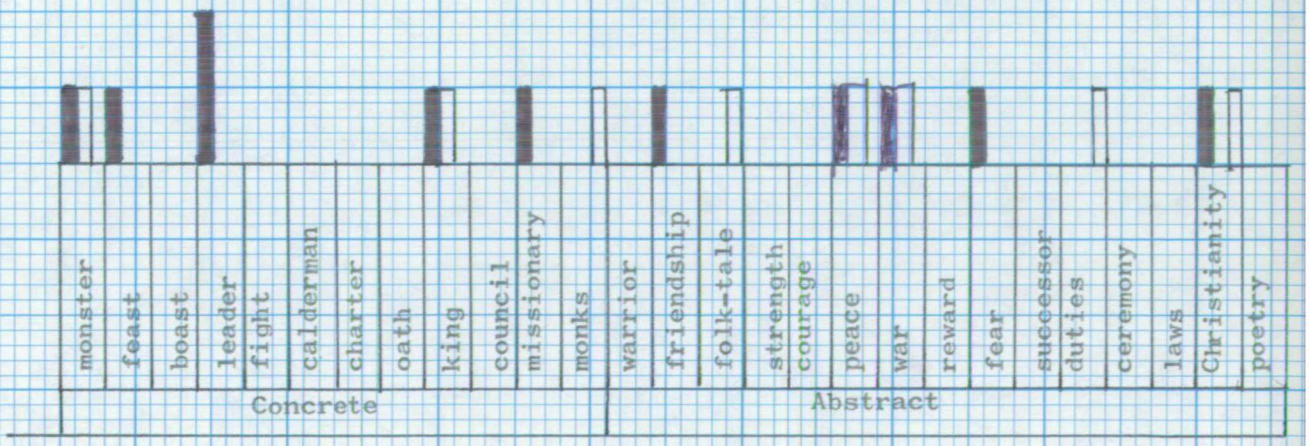
This bar chart shows that both led and unled discussion groups used some of the concepts learned in Unit 4, at all levels, and, as in Units 1 and 2, the led group used a slightly higher number.

1 cm represents the use of the concept in one evidence test on one or more occasion.

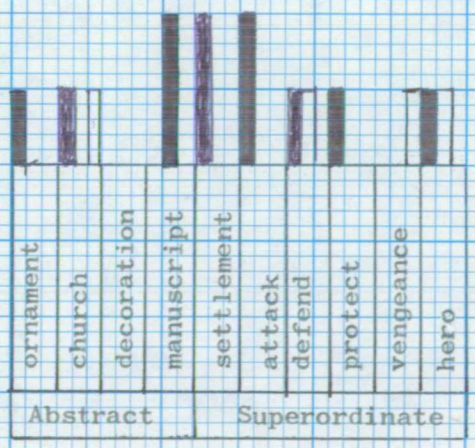
▮ represents led discussion groups (Exp. 1)

▯ represents unled discussion groups (Exp. 2)

		Concrete	6
Exp. 1	Led Discussion Groups	Abstract	9
		Superordinate	7
		Concrete	3
Exp. 2	Unled Discussion Groups	Abstract	6
		Superordinate	3



Taught concepts in Unit 4 in discussion tapes (cont).



Bar Chart 3.3

Concepts taught in Unit 1 or Unit 2 which were used in written evidence tests in Unit 4 by Exp. 1, Exp. 2 and Control Group children.

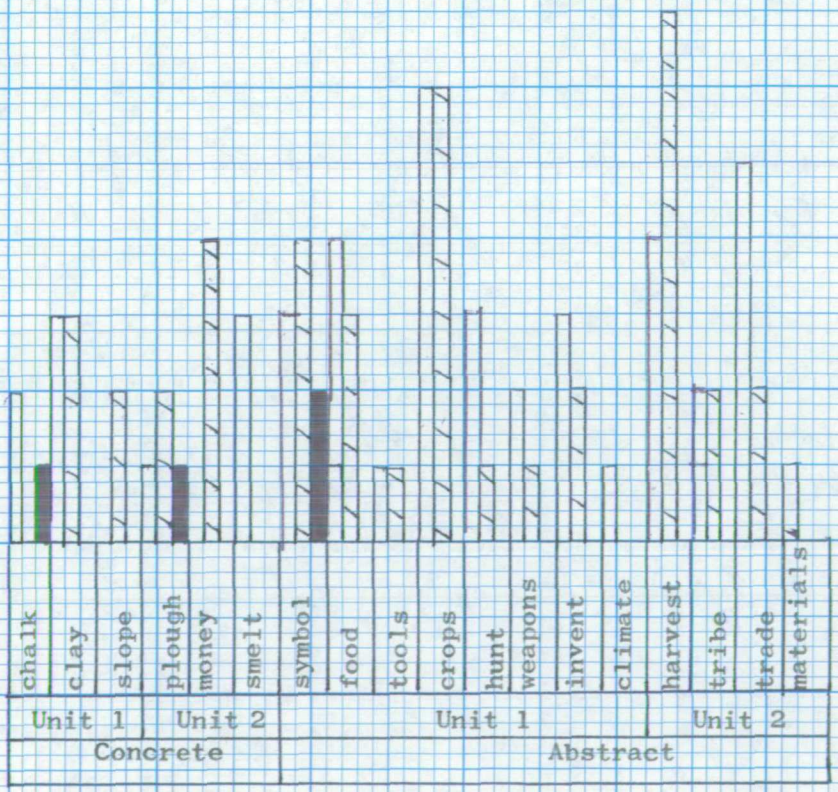
This bar chart shows how children in both experimental groups retained concepts learned in Units 1 and 2 and applied their answers to Unit 4. The control group used no abstract key concepts.

▯ represents 1 concept used by Exp. 1 Group child

▯ represents 1 Exp. 2 Group child

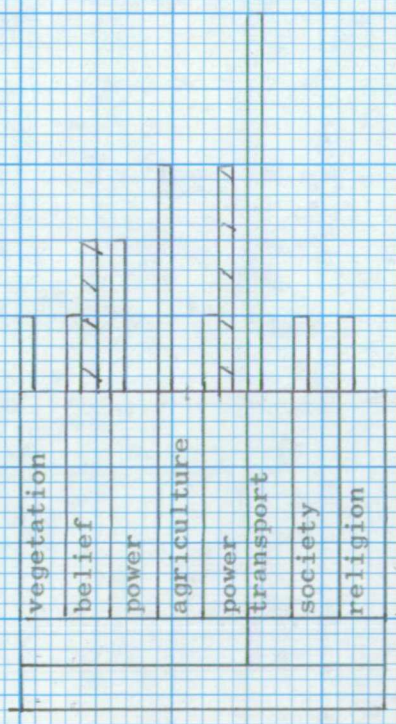
▮ represents 1 Control Group child

Concrete		Abstract		Superordinate	
Exp. 1	9	Exp. 1	34	Exp. 1	15
Exp. 2	11	Exp. 2	29	Exp. 2	5
C.	2	C.	2	C.	0



Bar Chart 3.3 continued

Concepts taught in Unit 1 and Unit 2 used in written evidence tests in Unit 4



D3. Analysis of the Written Evidence Tests. Unit 4

Analysis of Unit 2 suggested that empathy (the ability to understand why people in the past thought and behaved differently from us) develops through learning to discuss evidence. The experimental groups' answers showed a fertility of valid suggestions about how the evidence was made, or used, or what it may have meant to people at the time. It was argued that through making such a rich variety of valid interpretations, children begin to understand the values, attitudes and ideas of a society other than their own. It was suggested that discursive teaching strategies accounted for the fact that the experimental groups' answers were more varied and less anachronistic than those of the control group. Nevertheless, the control and experimental groups both brought previous knowledge to bear on the tests. In analysing Unit 4, we shall see how different teaching strategies may have influenced the ways in which they used this knowledge.

In test 1, the replica of the Sutton Hoo sceptre, we shall see how the experimental group children test the sceptre against their existing knowledge of Anglo-Saxon life, using concepts such as king, ceremony, symbol and laws, then offer a range of valid interpretations based on this conceptual framework. The control group tend to restate given information and any attempt to go beyond this often leads to anachronism. In test 2, the illuminated manuscript picture of harvest, the experimental groups interpret the picture by relating details in it to abstract concepts learned in previous units: agriculture, community, communication, trade, crops and transport. The control group, who had no such framework of concepts, could only bring a few points of given information to bear on the picture. There were frequent anachronisms. Probably this was because they had not had the opportunity through discussion to reveal their

misunderstandings and have them clarified. (Okpala (in Slater F. 1989) shows how discussion and interaction makes teachers aware of children's misconceptions in understanding maps).

In test 3, the plan of the Saxon church at Cirencester, we shall see that some children in the control group, with scores throughout the NVR range, were able to go beyond the given information and develop original points. However, the experimental children seemed able to extend the information which they already had, to cover a wider range of ideas, showing a deeper understanding of change. They were aware of successive Roman, Saxon and Christian influences and of possible changes in the size and social organisation of the local population. The process of settlement by the Saxons and of the spread of Christianity had been studied by the experimental groups in Unit 4 lessons 1, 4 and 5 (Appendix XII). The control group answers showed an awareness of change, that Saxons may have built on Roman foundations, and that monks may have 'lived in' churches.

They also brought their own experiences of Christianity and of going to church to bear on their interpretations and showed an awareness that these may have meant different things to Saxon people. In test 4, the map of the Croydon area in Saxon times, we shall examine the misunderstandings which sometimes arise in both control and experimental groups when children go beyond the given information. The control group were often very successful in applying specific given information in a logical way to the map, yet when misunderstandings did arise, they were more crude and complete than those of the experimental groups, showing no understanding of chronology and change and often leading to anachronism. The experimental groups were more likely to show evidence of internal dialogue if their initial deduction did not seem satisfactory. This often involved testing them against concepts: clay and chalk, slope, crops,

plough and vegetation. Test 5 was an excerpt from Beowulf. Both control and experimental children attempted to make sense of the difficult language and discussed the significance of written evidence from Saxon times. Both groups were aware that Beowulf is a legend. Nevertheless, the control group were more inclined to accept the story at face value and less likely to see it as representing the feelings and ideals of Saxon society. The experimental groups used concepts which they had learned, such as fear, heroes, courage, fighting, power, beliefs, vengeance, boasts, to help them towards an understanding of the meaning the poem may have had for Saxon people.

In analysing the evidence tests in Unit 4 then, we shall see how information acquired through discussion using selected concepts enables the experimental groups to relate the new evidence to these concepts, then generate a range of valid interpretations. The control group are more likely to regurgitate given information. This is probably because they have had less experience of discussion and certainly because they were given specific points of information, rather than a broad framework of concepts which could be transferred and reapplied. It seems then that discussion which revolves around key concepts makes it possible to produce a wide range of valid suggestions about new evidence, and that by doing this, children begin to understand what the evidence may have meant to the people who made and used it. Limited specific information, on the other hand, is not transferable and often leads to anachronism when children try to go beyond it, or to apply it to new evidence.

Unit 4. Test 1. Replica of the Sceptre. Sutton Hoo Ship Burial
B.M. Slide ML18

The experimental groups interpreted the sceptre within the framework of the knowledge of animals in Anglo-Saxon art, the uncertainty of Anglo Saxon life, the need for loyalty, and tales of boastful leaders they had learned through Beowulf (lesson 2) and their understanding of kingship, power, law and succession (lesson 3).

(i) The deer

P.C. Exp 2 (NVR 114) Qu. 2 level 8

The gold sculpture deer may be saying save our lives or where we live .*. Maybe the sceptre was saying kill us and be warned - DIE. Or maybe the deer commemorates the beginning of earth. That might be why the ruler carries it to show he is the ruler for God on earth.
In Qu. 3, P.C. wonders what it was used for in ceremonies, so that we can find out the reason of the deer on top.

C.L. Exp 1 (NVR 122) Qu. 2 level 8

We can guess if it was an ornament they had ornaments, and what sort of a symbol the animal was, and therefore that the symbol has something to do with animals.

(ii) Uncertainty of life in Saxon times

D.S. Exp 1 (NVR 88) Qu. 1 level 6

I know that the septer is a good luck thing made out of stone with a stag, the stag is a sinbel. They wanted good luck be cause they were always fighting.

(iii) Loyalty

A.W. Exp 2 (NVR 128) Qu. 1 level 9

They had kings .˙. they must of had to be obedient, they must of had to be loyal. They had a sceptre .˙. if it had an animal or person on it must of meant that was a symbol of power. It must of (been) hard to be loyal to one person.

(iv) Boastfulness

I.W. Exp (NVR 123) Qu. 3 level 7

I'd like to know why this is made out of stone, because it might be heavy and why there is no picture of himself on the main part because it would tell us what sort of a king he is. Is he a boastful king?

(v) Kingship, authority and law

R.L. Exp 1 (NVR 107) Qu. 1 level 9

RL, in spite of great difficulty with writing, formulates the idea that 'It must of been a simdle (symbol) .˙. it was prechurs (precious). It was hard to make .˙. it took a long time, and so it was uneck (unique).'

J.K. Exp 2 (NVR 88) Qu. 3 level 7

Why have it? Wat was its purpose? Was it to show his power to rule weth, or to make people thing he was power? Wid the king of thort it ruled the peoples minds?

A child who has internalised knowledge about seven kingdoms based on succession may assimilate the new evidence and express this process in an idiosyncratic way.

R.F. (NVR 105) Exp 2 Qu. 2 level 5

I can guess that his father or grandfather crowned him King Ethel Bert. I know he was made King in Saxon times .˙. I can guess that he had lodes of king friends.

K.G. (NVR 99) Exp 2 Qu. 2 level 8
relates the sceptre to her knowledge of conscientious rule based on support: I guess it could of been a gift from his government .˙. he had a good government, I guess he did a good peace of work .˙. he was a good king and a hard worker.

E.S. (NVR 129) Exp 2
tries to accommodate the sceptre to her knowledge of law, religious uses and peace, then in question 3 to relate it to her knowledge of coexisting Christian and pagan beliefs. She wants to know (level 8) 'why they berried things - to know if it was berried to a reason, and if the stag was a symbol because they were finding different religens.'

The control group had been given specific points of information which they frequently restated: the sceptre was found at Sutton Hoo (11 instances); no-one could speak without holding it (15 instances); it was made of bronze (11 instances). Possibly because they could not test the evidence against a framework of learned concepts through internal dialogue there was little variety, and frequent anachronism in their answers.

T.W. (NVR 107) spends questions 2 and 3 (level 1) wondering whether they were blind because she has never heard of blind Anglo Saxons.

P.C. (NVR 115) Qu. 2 level 6 says that he 'would like to have one to stop Alan talking' and guesses that the shops 'must have been well with customers because everyone wanted one .˙. only the rich could have one and the poor must have been green with envy.' He still scores at level 6 for guessing that it was valuable and .˙. 'only rich people had them.'

G.R. (NVR 87) also shows anachronism and so complete lack of empathy. He wonders (Qu. 3 level 4) if the sceptre was used in schools although he scores at level 4 because he wonders if the sceptre is made of a mixture of tin and copper.

C.S, who has an NVR score of 136, would like to know 'if they are still in use, because if not it could be quite noisy' yet reflects that if everyone had one it would be easy to talk to someone.' For this she scores at level 2.

B.P. (NVR 129) wants to know how tall it is 'because if I had one I would get a suitable place to put it.' He still scores at level 5 for asking how tall it is, and how it was held.

Not all the children display such anachronism. Some answers show logical use of the given information. For example:

L.B. (NVR 119) level 7 says that the sceptre was found in a Long Boat at Sutton Hoo .˙. the boat sailed down the river.

and

J.W. (NVR 122) Qu. 3 level 8 would like to know where the sceptre was made, to see how far the boat travelled, and wonders why it had a stag on it and not another animal.

Test 2. Unit 4. Picture: Illuminated Manuscript Showing Harvest.
B.M. Library slide made for this purpose. F 21985

In analysing Test 2, Unit 4, we shall see how the experimental groups interpreted the picture within a framework of on-going key concepts which they had been developing through the previous three units: agriculture, community, and communication. It is clear that they continually reapply the concepts they have been learning throughout the course (see bar chart 3.3).

Again, the control group attempts to repeat given information they have not discussed or internalised. This is not related to learned concepts and often results in anachronism or in restatement of the given information.

The Experimental Groups

(i) Agriculture

The experimental groups discuss crops, farming methods and the cycle of the farming year. C.B. and R.D. say the people seem to be cutting logs and transporting them - maybe to trade them - if they live near a forest. H.C. Qu. 1 level 8, says "They had plans .˙. they sorted things out and they had flower .˙. they had bread." N.C. Qu. 2 level 7, suggests "They could be putting animals and crops in barns .˙. it's cold and it's winter time." M.F. Qu. 1 level 9, notices "They had carts .˙. they could bend wood or metal." "They kould make sickles .˙. they could shape metal. They had lots of intelligent skills." H.G. Qu. 1 level 7, also says "They had carts .˙. they could move things around." M.H. Qu. 2 level 9, "There is only a small hole in the cart to pull with .˙. a person might have put their head in it instead of a horse. The person in the blue jacket has a hunched back .˙. he might have a disease. They may have used men to pull things as well as horses."

L.W. Qu. 2 level 7, guesses that they would build their huts by hand and carry wheat and corn on their back and .˙. "they must of got sore backs a lot." She would like to know Qu. 3 level 7, "what do they eat because it looks like they don't get much food." S.K. also sees that they carry loads on their back "which must be sore" and wants to know how they stored things and disposed of waste, (Qu. 3 level 7) "I would like to know where they put the bad bits because they did not have bins and where they put the food bits because they did not have a larder."

There is a general consensus that the picture shows harvest, although the unled discussion group briefly considered, in the light of Sutton Hoo, that the cart might also be to take a body and grave goods to a burial ground!

(ii) Social Organisation/Community

Many in the experimental groups refer to the jobs people are doing and the relationships between them. They recognise that the man on the left appears to be in charge, and discuss who he is and what he is doing. K.C. Qu. 2 level 7 "At the bottom I think there is a can of some sort. I think they had money but not like ours .˙. they had learned to trade money for something like food." I.W. Qu. 2 level 9, "We can guess the man on the rock is the leader .˙. the men carrying things are slaves.... therefore they were trained for this particular job." K.M. Qu. 1 level 6....."There is a man standing on a bag of grain or something. He looks as though he's in charge .˙. He looks as though he's telling them what to do with his ideas." E.S. Qu. 2 level 9, "They might be the king's servants .˙. they had servants. The man on the sack may be telling them what to do .˙. they had commanders. They had important people."

Whatever the relationship between the man and the group, many children notice that the people have different jobs. J.W. thinks they are working in groups with a man in charge and that the leaders probably get their orders from a chief? B.K. says they are "sharing ideas" and H.C. that they have got jobs "sortid out." M.H. Qu. 1 level 9, "There are two men on the cart. One is higher up and one is carrying a weight or a sheep...and one is keeping the other up. They are working together...." Two children notice that "only men are working" and wonder if this is because the work is too hard for the women.

(iii) Communication

There are various suggestions about the meaning of the writing. J.G. and A.W. guess that it is Latin. J.G. Qu. 3 level 5, wonders if the Saxons learned it from the Romans, but A.W. and D.S. guess it was learned through the monks. A.W. Qu. 2 level 8, "I guess the monks wrote it .˙. it would be in Latin..." D.S. Qu. 2 level 8, "monks were taut to read and rit in neat ritting .˙. they could riht callnders and they could tell the maths of the year and they cerpt in toch with they date." J.G. thinks the picture accompanies the writing "to give the reader a clearer picture in his mind, and N.H. says it shows they "had imagination" although P.K. points out that since it was made in Saxon times, it is "probably true." P.K. Qu. 2 level 8, "This picture was made in the Saxon times .˙. it must be old and is probably true." S.H. Qu. 1 level 9, concludes that "We know they could write .˙. they could write things. We know that they were good at drawing .˙. they could make calendars with pictures. They had lituriture."

The Control Group

The Control Group were not able to relate the picture to a framework of learned concepts. (This is clear from chart 3.1). They could only bring to bear on it a few points of given information: that this was a calendar in a kind of Latin the teacher could not read, but that JUNI means June and XXX means thirty. Thirteen children mention Latin, and ten mention June, and many say it is to tell you what to do in the farming year. This information often leads to anachronism. D.H. (NVR 106) Qu. 2 level 4, "....it is fery hard to draw with now things..." P.C. (NVR 115) thinks "they were better drawers than me because I can't draw" and that "the calendar must have been very nice to have in the house," although he wonders why they needed calendars when they had plenty of time? He asks if they "knew all the months besides June?" P.C. (NVR 115) Qu. 3 level 6, "I want to know if they knew all the months, because they've only got June on the slide, and how did they have so neat writing, because they were always in fights..." C.S. (NVR 136) gives two logical answers, Qu. 1 level 7, "I know the calendar is written in Latin .˙. some of them spoke a bit of Latin. I know they had months and this calendar is the month of June..." and Qu. 2 level 8, "I guess the numbers mean the date .˙. they would do things on different days." But she combines these with two anachronisms. In Qu. 2 level 8 she also says "I guess they rubbed it out after, because I can see paint marks on it .˙. they used it over and over again, so it must have cost a lot of money." And in Qu. 3 level 4 she asked first whether they had seasons, and then, "I would like to know if they had clocks or not, because if they didn't they couldn't know which time to go to places and they would be in the wrong place at the wrong time."

T.W. wonders, following the lesson on Latin (the teacher being a Classics graduate), "why they had missing letters in the alphabet?"

Very few points are made, although it is interesting that three children with very high NVR scores recognise a relationship between the man on the left and the rest of the group. S.J. (NVR 127) Qu. 2 level 8, guesses that "the picture is the people giving the boss their things .˙. the boss must have made them give them to him if they didn't they probably would be punished." B.P. (NVR 129) Qu. 2 level 5, guesses that "some people are cutting corn, some are putting something on a cart, and the others are showing their work to the lord of the field."

Unit 4. Test 3. Plan of the Saxon Church at Cirencester, from 'The Archaeology of Anglo-Saxon England' D. M. Wilson, 1976.

The Control Group, then, tended to repeat limited received information rather than generate a variety of ideas, partly because they were not developing a framework of concepts throughout the four units to which they could relate the new evidence, and partly because they had not learned 'the rules of the game' - the thinking patterns which were expected. Nevertheless, in analysing unit three, we shall see that, although most of the control group again repeat given information, some children are able to develop this. The class seems to have been told that the materials in old buildings are often re-used (13 children mentioned this), that the Saxons often built on Roman foundations (5 answers), that the church was big, and that monks often lived in churches (11 answers). The answer of F.S. (NVR 113) Qu. 1 level 2, shows how control group children often 'repeat all they know' rather than take the evidence as a starting point. She says that "the monks took mass. Therefore people believed in God. Therefore, missionaries taught people about God and made them Christians." G.R. (NVR 87) however, scores 7 in Qu. 1 for a logical development of the information given. "The church was 55m long and 17m wide. Therefore it was big." Yet some of the control group children develop the given information in their own way. K.D., whose NVR score is only 76, says "The church is big .˚. it is a very neis church." - Qu. 1 level 6. N.L. (NVR 104) Qu. 1 level 7, makes three original points. She says that "The church was big, therefore there must have been a lot of people in it." In Qu. 2 level 7, she guesses that "The Saxons did not have coloured glass in the windows, and they didn't have many windows, so it was probably quite dark - and smelly." In question 3, level 5, she wonders "if they had a service every day and if they had songs."

A.R. (NVR 106) Qu. 1 level 7, thinks it must have been made of wood and stone, "because that's all they had, " and, "therefore the wood might be rotten away." D.H. (NVR 105) Qu. 2 level 6, guesses that "the church was serviced by monks and was made with stone, and so it was very strongh." In Qu. 3 level 4, he wonders "if the monks spoke latin, and if some Saxons nicked the stone." D.H. (NVR 106) Qu. 2 level 7, guesses that "the church is very big .˙. there were others as big as this." Both L.B. (NVR 119) and C.S. (NVR 136) extend their received information in original ways for all three questions. L.B. Qu. 1 level 9, says that "it is a church .˙. it is a place of worship, and therefore the Saxons were religious." L.B. Qu. 2 level 8, also guesses that the monks could read and write latin, and taught the rich children latin and that the "bricks that were taken away were probably the best ones." (However, both these answers seem to reflect the teacher's information rather than the diagram.) In Qu. 3 level 7, L.B. also applies her own experience that "heroes are sometimes buried in churches," but wonders "were the monks or the Abbot?" C.S. says, logically, that Qu. 1 level 9, "I know the church is 55m long and 17m wide .˙. it was big and a lot of Saxons must have gone to church. They must have believed in God." She wonders, Qu. 3 level 7, "Did the monks stay in the church all the time, because they might go to other churches and see other monks?"

The experimental groups, too, had received information. They had, for example, learned in lesson 4 that St. Augustine brought Roman-style Christianity from Rome to Canterbury, but whereas the control group were fixed on the idea that Saxon buildings were often built on Roman foundations, the experimental groups developed their recognition of (J.H.) "a Roman stial building" in a number of ways. D.F. (NVR 120) Qu. 1 level 9...."The church apse design was Roman .˙.

St. Augustine had preached and made that part Christian..." and Qu. 2 level 9, "they could build proper buildings .˙. they must of picked up ideas from the Romans." M.F. (NVR 135) Qu. 2 level 8, guesses that "the Roman bit of the front has most of it left .˙. the Roman bit was stronger." In question 3 level 9, he wonders, "if the Romans lived here before, because I have heard of a Roman villa at Cirencester," and, "if St. Augustine came here, because of the Roman bit, and where all of the churches have the semi-circle bit." M.S. (NVR 120) pointed out that "the apse shows they could curve the end of the church."

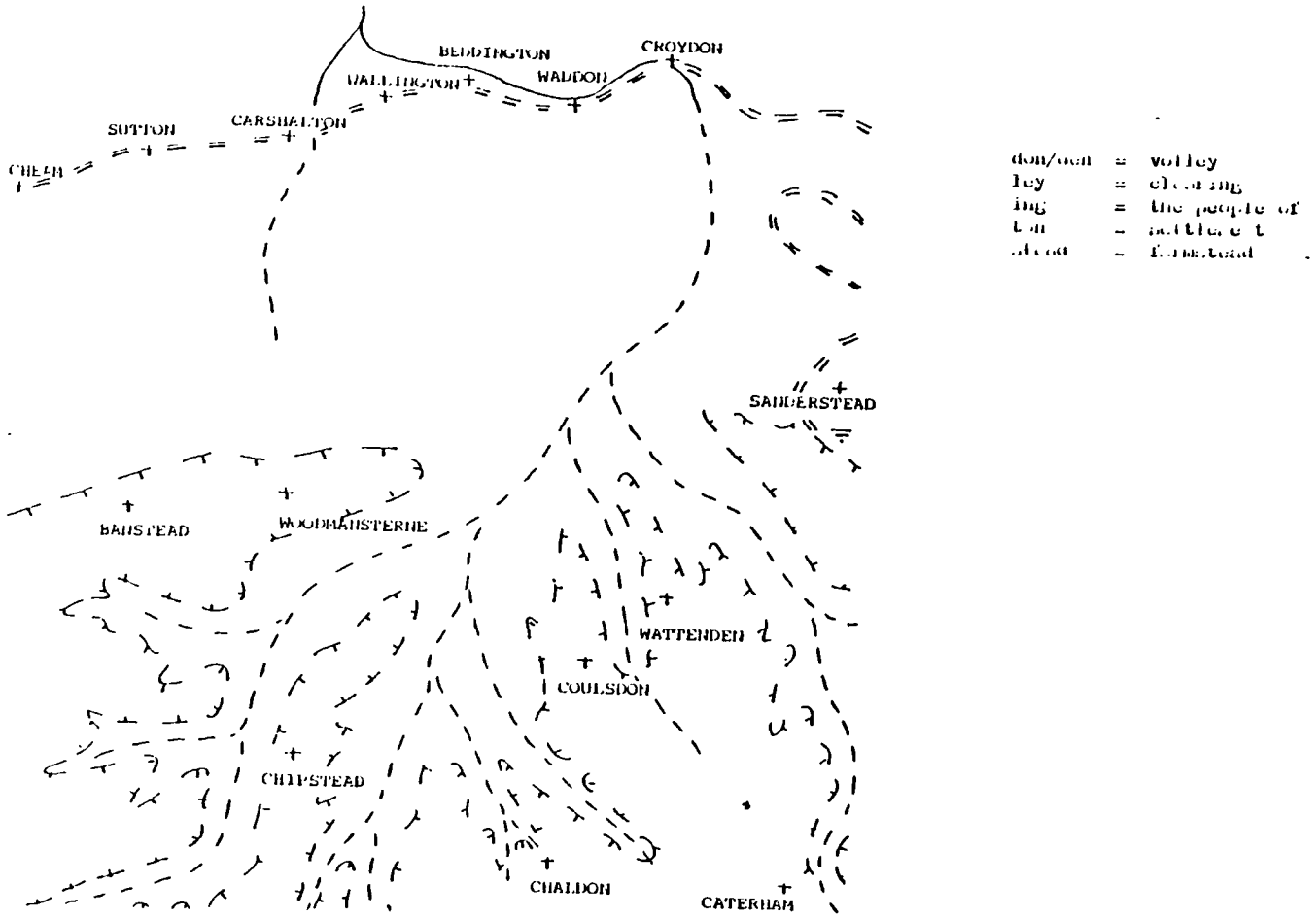
While the control group centred on the knowledge that old buildings are often knocked down and the materials re-used, M.H. (NVR 108) Qu. 2 level 5, used the evidence of "probable Saxon walls" to wonder haltingly, "probably the wall was knoked down by enerys or it must have been knocked down by sumthin - a strong wind?"

Whereas the control group said that the church was big and so held a lot of people, the experimental groups used this information more specifically to make a variety of points. M.S. concludes Qu. 2 level 9, that "the population must have been high." J.G. (Qu. 2 level 9) guesses that "It had more adjuncts that haven't been excavated .˙. it was bigger. It might have adjuncts because more Christians came to Cirencester .˙. more people in Saxon Britain were becoming Christians. Most of Britain became Christian. Two children estimated that it would take 1,000 people to fill it. S.K. (NVR 115) Qu. 3 level 6, attempts to imagine what the church might have sounded like when it was full of people, "I would like to know how big it was, because in some churches there is an echoe, but if it is crowded it might be very loud and there is not." N.T. and I.W. wondered who paid for it. N.T. (NVR 98) Qu. 3 level 7, "I would like to

know how much people got payed to build the church, because I would like to compare it with now." I.W. (NVR 123) Qu. 2 level 8, "we can guess a lord had this built .˙. he must be powerful. They had powerful lords." S.H. said that since it took time to build it he wondered what they used in the meantime. S.H. (NVR 104) Qu. 3 level 8, "I would like to know how long it took to build the Church, because I would like to know what they used while it was being built, and if they extended it often, because they might have started with a small church then extended it." C.B. (NVR 96) Qu. 1 level 7, made the interesting point that "this is a diagram of a Saxon church. It is at Cirencester .˙. they had needed a church and they worked hard for something they really wanted."

Besides developing their taught information in a variety of ways, the experimental groups also brought their own experience of churches to bear on the evidence. J.G. (NVR 120) Qu. 3 level 7, wondered "Did it have more to it, because I would like to see it being excavated. Did it have a graveyard, because it could have had a ceremonyall service?" C.B. wondered if the church was used for more than one purpose "for singing and for burying the dead?" E.S. thought the little rooms might be "for discussing things" and E.S. (NVR 129) Qu. 2 level 7, also thought "they could share things and be part of a group. Some of the rooms might be for speshle things." M.H. suggested they may be for storing bread and fuel. C.L. wondered if they had "bells" and K.M. (NVR 116) Qu. 3 level 7, wondered "if the monks enjoyed their life of reading and writing, because I get tired of it."

Unit 4. Test 4. Map of Croydon Area in Saxon Times



The definition of the symbols and of Saxon place-name endings on the map gave the children a great deal of precise information. The experimental groups had also visited Coulsdon, and discussed place-names, Charters, and hedge-dating in relation to it, in lesson 5. Was there a difference then in the ways the experimental and control groups interpreted this given information? Analysis shows that the experimental groups brought their more detailed knowledge and direct experience to bear on the map, and this made it easier for them to understand it. They had a better understanding of the qualities of clay and chalk and of the significance of the spring-line as being the point at which they met. They understood from their visit that the settlements to the south were not in fact on slopes, but on flat land on the top - a factor which the control group were confused about. Some of them also employed their knowledge from lesson 1 that the Saxons sailed down the tributaries of the Thames, and their knowledge from the previous Units, that settlement, a concept

mentioned by 15 experimental group children, depends on suitable soil for crops, and on a water supply.

Fig 3 (v) shows that both experimental groups performed at a higher level than the control group on this test, and Exp. Group 2 did better than Exp. Group 1. Nevertheless, some children in control and experimental groups (particularly Exp. Group 1) throughout the NVR range, misunderstood the information in the map. Analysis shows that there was a marked difference in the kind of misunderstandings shown by the experimental group children and the control group children. The experimental group children may misunderstand the scale, or a term such as 'dried-up river' or may make, then correct, a false premise. The control group children, on the other hand, when they made invalid deductions, revealed startling anachronisms.

First let us consider the kinds of misunderstanding that the experimental groups sometimes revealed when they tried to go beyond the information given. M.H. (NVR 135) Exp. 2 develops several ideas from the map, e.g. "Croydon is on a river and a Spring. Therefore they might have a bigger community," and he wonders, "if the people in the line were friends, because they might help each other to protect more north of them, and have a special friendly 'thing' to protect each other." He says, too, that "Coulsdon was probably there before the water dried up and therefore they had to collect water differently, maybe building a pond to collect rain water." Yet it was noticed in Units 1 and 2 that, coming from Madras, he was very conscious of the importance of water. He combines this with his taught information that the Northern and Southern Saxons were different groups, and because he misunderstands the scale of the map, concludes that "the northerners had most of the water and the southerners had a hot climate."

J.W. (NVR 117) Exp. 1 gets confused by the dried-up river. "I would like to know if the old rivers and the new rivers are mixed up. You won't be able to tell the difference." C.L. (NVR 122) Exp. 1 is similarly confused, "There was an old river there. Therefore it wasn't clean anofe to drink." S.H. (NVR 104) Exp. 1 Qu. 3 level 8, makes several perceptive statements. He "would like to know how many springs you get to one settlement, because they might have used lots," and, "if there are any more deserted settlements because we might find out who lived there," but he also uses information from the visit without cross-referencing it with the evidence, "the hedges date back 700 years to the 13 centre," and guesses that "the old dried up rivers might still be there." D.S. (NVR 88) Exp. 1 shows a good understanding of the need for water, and of the need to settle in new areas, but her answers also verge on the anachronistic because she has not totally switched her viewpoint to Saxon times. She knows that (Qu. 1 level 5) "when they moved they had to make sure they had water to drink and food so that they coulde live without haveing to suffer being hungry. They had to make sure that they coulde live helfy with no probomes." She goes on to say, in question 2, that she guesses they live near a well "because it was quite hot in them days and they had to plow the fildes for food and they were always tryin to woke for monye of other pepol to buy seeds for a crop." In question 3 level 8, she wonders why they moved to another place, because "we stay for five years nowinare days." She however suggests that it might of bein a animal in the wild "that was caseing them that there was no water enay more?" She seems to have resolved the anachronism she first stated for herself - accommodated it into her knowledge of Saxon England through internal dialogue. Similarly, B.K. (NVR 88) Exp. 1 seems to have reassessed her initial opinion of the Saxons by testing it against the evidence. In view

of the fact that they selected sites with good water supply and soil she concludes that "This might mean that Saxons lived happy kinds of lives although they fighted." G.B. (NVR 86) Exp. 1 seems to have put himself in the position of a migrant Saxon very effectively (considering his immaturity) after studying the map, "They hed a lod of rivs. I think one poson gos dan a valley at a time, and no one was allowed at nit. I wood not like to go dare a dark vale." I.W. (NVR 123) Exp. 1 and E.S (NVR 129) Exp. 1 also try to put themselves in the place of people who settled the area in a slightly more sophisticated way. E.S. Qu. 2 level 9, suggests that since there were old rivers running down the valley, there was water near them, and if they sailed down these rivers in smaller boats, they had to stop and build them, and therefore they were well 'educted' (educated - prepared) for this trip. I.W. wonders how and why they moved, and if they sent someone on ahead to find a good place. Finally, P.C.'s answer to Qu. 1 (NVR 114) Exp. 2, demonstrates clear reasoning, but he applies his learned information which is not tested against information in the map, "We know where they settled - by springs and rivers. We know that unlike the Iron Age and the Stone Age they farmed on clay soil instead of chalk soil .˙. they had more sophisticated ploughs. We know many of the places where they settled, Cheam, Sutton, Waddon, Croydon, and so on." Sometimes, then, the experimental children either made deductions not based on the evidence, or went beyond the information given and drew mistaken conclusions.

In the control group, several children gave excellent interpretations of the evidence given. F.S. (NVR 113) asks in Qu. 3 level 8, "Why did the rivers dry up, because there are not many droughts in this country?" and "why didn't the river Wandle dry up?" (this group seem to have been told that the river is the Wandle) "because it would be funny if all the other rivers dried up and not the Wandle." L.M. (NVR 136) Qu. 3

level 7, guesses that Croydon "must have had a good supply of roach, and, since there were a lot of farms around as well, they were never short of that much food, although the springs and rivers probably caused a lot of floods." C.J. (NVR 133) supposes that walking "at the bottom of the map" would have been very hard so there would have been little movement, while J.W. (NVR 122) guesses that since places like Chipstead, Banstead and Sanderstead were farms, there would have been a road running between them. M.B. (NVR 95) wonders "if it was snowy in the winter, how did they get around?"

Yet when the control children do misinterpret the map, their answers show <u>less</u> historical understanding than the mistakes of the experimental children. There are many anachronisms, which show no understanding of the processes of historical enquiry, or of change. Three children seem to think the map was made in Saxon times. N.C. (NVR 114) Qu. 3 level 2, wants to know "how did people discover this map?" and "who thourt of the names of the places?" and N.L. (NVR 104) Qu. 2 level 2, thinks it shows "what a Saxon map looked like in those days. It is very different from the ones we've got know." L.B. (NVR 119) Qu. 3 level 2, would like to know "if they had Beddington Park in Beddington, because I have never been there and I hear it's a very nice place?" N.L. (NVR 104) Qu. 3 level 1, also wonders "if they had been to Beddington Park because I've been there and it's supposed to be quite old." She wonders, too, whether Croydon had a shopping centre. C.S. (NVR 136 Qu. 2 level 6, correctly guesses that "most of this map has changed. New towns have been built" but this answer shows no understanding of time-scale. Her question "when di they name Croydon Croydon?" shows no understanding of how place-naming developed. Again, there is a sex-oriented answer. L.M. (NVR 136) thinks the Saxons lived near springs "so the women could get water?" !

Unit 4. Test 5. Beowulf. Penguin 1973 lines 824-838

Both the control and experimental groups had been given some information about this extract from Beowulf. In lesson two (Appendix the experimental groups had read other extracts and had discussed the idea that it is a folk tale idealising the courage of earlier warrior bands in which Grendel personifies danger. The control group answers show that they had been told that this is part of a longer story which is a myth or legend; it is only partly true, and was nct written down but passed 'from father to son'. They had been told that the Saxons 'liked to tell fierce stories around the fire.' In analysing test five, we shall see to what extent the control and experimental groups used this knowledge in different ways.

Children in the control and the experimental groups considered both the significance of the language in this extract, and the fact that it was part of a folk-tale. First let us compare the ways in which control and experimental children tried to understand the language, both the meanings of individual words, and the significance of a piece of written evidence dating from Saxon times.

Attempts to Understand Individual Words in the Text

Control Group	Experimental Groups
T.W. (NVR 107) Qu. 3 level 7 "I would like to know what Gaet means."	M.H. (NVR 135) Qu. 1 level 6 "'Made good his boast' means he boasts for a reason - to be popular and get support for his next encounter" and "he had come from afar (meaning it took a long time then) but it would only take a few days to get there now."
C.S. (NVR 136) Qu. 3 level 8 "I would like to know why Grendel was called Grendel. It sounds very strange. Is Grendel a latin name or an English name?"	C.L. (NVR 86) Qu. 3 level 5 "What did Gaet mean in Saxon times? Why did they call it gable roof?"

Control

S.J. (NVR 127) Qu. 2 level 7 "I think that 'gable roof' is the bit just below the top of the house. I think that the 'evil menace' was Grendel.."

J.C. (NVR 107) Qu. 2 level 7 "I think the Saxons lizard to all the words.."

Experimental

Applying their own concepts to the text

The control group had not been taught such concepts as strength, courage and friendship, vengeance or hero, but they tried to express them using their own vocabulary:

L.B. (NVR 119) Qu. 2 level 7 "I think the monster was strong and macho. Beowulf would have to be macho as well. It must of been a big fight."

N.C. (NVR 114) Qu. 1 level 7) "Grendel was the baddy and Beowulf was the goody."

M.B. (NVR 95) Qu. 3 level 6 "I would like to know did the Saxons like to help each other?"

The experimental groups had been introduced to selected concepts. They did not necessarily use them in their answers but they too used similar words from their own vocabulary; some had been taught 'fear', but used 'scared' or taught 'courage' and wrote 'bravery'.

However, sometimes the abstract concepts they had learned released a range of subordinate concepts in their answers. Many of them said Beowulf was a 'warrior' and a 'hero' altho gh this was not given in the text. From these concepts they went on to sug est that therefore he was good, clever, strong, famous; that he led in fighting and would be rewarded.

Attempts to explore the significance of writing in Saxon times

Control	Experimental
N.C. (NVR 114) Qu. 3 level 5) "I would like to know who wrote the story, and all the people who read it.	M.F. (NVR 129) Qu. 1 level 9 "It is a Saxon poem. Therefore they had forms of writing. Beowulf was made up .˙. it would of been a folk tale or legend. It is true in that there was a famous warrior."
L.M. (NVR 136) Qu. 3 level 5 "I would like to know if there are other stories, and where they are. I should like to read them."	J.G. (NVR 120) Qu. 3 level 8 "Why was it made up, because it could have been a lesson to people and have a meaning. How did they know all these words, because it would tell us about their knowledge."
P.C. (NVR 115) Qu. 3 level 6 " Did they copy this from other stories, because I think I heard something like that in another story. And who started it? Was it the stone age.... the tradition carried on?"	M.L. (NVR 102) Qu. 3 level 6 "I'd like to know if Beowulf could write..to know if he writes like us.
C.S. (NVR 136) Qu. 3 level 8 "Did they have other sorts of stories told to them because I would like to know if they had different stories apart from ones like this."	C.L. (NVR 122) Qu. 1 level 4) "I know they could write."
and C.S. Qu. 2 level 7 "I guess they were all fierce stories.˙.they did not have children's stories. I guess there were many other stories."	F.B. (NVR 125) Qu. 1 level 8 "We know the Saxons could write .˙. they probably had people who could write for the rich people, and some people could write and others not. They believed in stories .˙. folk-tale like that meant a lot to them."
S.J. (NVR 127) Qu. 1 level 7 "No one wrote this story down. They just told it to other people. Therefore, as time went by, they learned to write and they could write stories down."	B.K. (NVR 88) Qu. 2 level 4 "Some people might have been unhappy because a victim from their family might have died.

Control	Experimental
	K.M. (NVR 116) Qu. 1 level 7 "Beowulf killed the monster...Therefore the villagers were relieved.
	C.L. (NVR 86) Qu. 3 level 8 "I would like to know what Beowulf looked like and how old he was because he might be rich or something, or he might have been young but very brave.
	J.K. (NVR 88) Qu. 2 level 8 "They must of like to mack things up to mack the story good to here .˙. the people who made the story up wantid it to be good. They put the monster in the story .˙. the story is good because it is made u

Secondly, both groups had been told that Beowulf is a folk tale or legend which is in some way rooted in truth. Let us see how they used this knowledge to interpret the given extract:

A. Repeat story logically at 'face-value' with no attempt to examine its relationship to truth or its symbolic me ning although stating that it is a legend.

G.R. (NVR 87) Qu. 1 level 5 "The Saxons liked fierce stories..the story is a legend." G.R. then scores 8 in Qu. 2 for a logical account of the story: "Grendel was eating people. The people were scared. Therefore Beowulf slayed Grendel and the people were happy."	R.K. (NVR 105) Qu. 3 level 5 "How big was Grendel and how long did the fight go on?"

Control

Similarly, B.P. (NVR 129) (42 points higher than G.R.) Qu. 2 level 8 concludes that "the stories are not really true but there's a few true things in it." Then goes on to say in Qu. 3 "I would like to know where Grendel came from and what the home was made of." (Yet he scored at level 5 because he wonders if the house was made of wood and would burn).

S.J. (NVR 129) Qu. 3 level 5 asks "Is the story true?" but goes on to say, "I would like to know whether Beowulf chopped or tore Grendel's arm off because if it is true it is horrible."

A.R. (NVR 166) having said that it is only a "fere store" wants to know Qu. 3 level 5 "How old it is and was Beowulf rell or not?"

D.H. (NVR 106) Qu. 2 level 5 says "It is very, very old and gust a fery store."

B. State that the story is partly true and try to make a distinction between what is true and what is fictitious.

C.J. (NVR 133) having said in Qu. 1 level 7 that the story is a legend, goes on to guess in Qu. 2 level 7 that Beowulf killed a lot of "monsters" (in inverted commas)

F.S. (NVR 113) says that the story is not true; it is a legend and in Qu. 2 level 8 guesses that "stories were passed down from father to son .˙. that is how we know them today. When Grendel was killed the people were happy .˙. when in real life an animal is killed people were happy. They were good story-tellers."

R.D. (NVR 102) Qu. 2 level 6 "They might of been fighting and they mite turn onto the other side because they didernt have any curige." (R.D. seems to su gest that Grendel may have been invented to inspire unity against a common enemy!)

M.F. (NVR 129) Qu. 2 level 8 "It was probably based on a famous warrior. It would be partly true. It could of been set in a real place. Therefore they would either live near or know about it."

M.F. Qu. 3 level 7 "Where is Heorot, because I'd like to know if it was a real place? How many years ago was Beowulf written? because we'd see how good it was then."

J.G. (NVR 120) Qu. 1 level 8) "Saxon people could make up true and untrue tales and legens .˙. A Saxon that knew it off by heart introduced it to the Saxons in Britain. It came from Denmark and was passed around the countries and settlements .˙. Tales like Beowulf were passed around countries."

J.K. (NVR 88) Qu. 1 level 9 "They must have had some not true things in it .˙. They had to mak up somethings. The things in it are things that mit of hupnt .˙. The bit where he slayed the monster is not true. The monster was not true because no monster ever lived. Why mack it up? because it sounds good!"

R.F. (NVR 105) Qu. 3 level 7 "I would like to know who wrote (it) and how long ago is has been rote and why because I guess that something like this has happened. One person is mean and the other gets back what he done to the other person. Two wrongs don't make a right." (R.F. seems to be suggesting that the story has a moral).

M.F. (NVR 135) Qu. 3 level 7 wants to know "if nobody had seen him or part of him, because everyone who saw him whole was eaten." He seems to be tryin to argue that no one who claimed to hav seen Grendel had survived, so logically the story must be untrue.

K.C. (NVR 111) Qu. 3 level 8 "Would lik to know how many times it had been changed because it would be interesting to see how it started off" and "if Grendel was someone they feared, because it might be but I shall never know."

Finally, to what extent did children begin to understand the feelings, values and attitudes of another society, through trying to interpret this extract from Beowulf?

P.C. (NVR 115) Qu. 3 level 6 wonders "Why did they think of fierce people because it must have frightened the children sometimes.."

The only beginnings of an attempt to consider how people in Saxon times may have felt was by

T.W. (NVR 107) Qu. 2 level 9 She guesses "that lots of people were scared of dragons, because I would be, and I guess that Beowulf was proud of himself, because I think heroes ought to be brave and proud."

N.T. (NVR 88) Qu. 1 level 9 "Saxons believed in Grendel. Grendel can't be true. Therefore it's a folk-tale in some ways .˙. We know the Saxons had beliefs." Qu. 2 level 7 "Some people might have thought Grendel was going to come at night. Grendel could have been a famous story therefore they could have been very scared."

F.B. (NVR 125) Qu. 2 level 7 "Beowulf was very brave .˙. I guess the Saxons were very brave and strong."

M.S. (NVR 120 Qu. 1 level 8 "I know for certain it was a symbol of fighting. It's a folk-tale .˙. it must have been through lots of places .˙. they wanted us to know that they had courage."

Qu. 2 level 9 "I guess it could of been through a few places .˙. it must of beer a well-known story. I guess it was a symbol for fighting and braveness .˙. they must want us to know something. It must of been a popular story."

D.S. (NVR 88) Qu. 2 level 8 "I guess that they needed more land for their crops so they had to fhit before settled in the place. They wanted to kill

Grendel to rule the land."

Qu. 3 level 7 "Was Grendel a monster or just an enemy? because I know they did not like him whatever he was."

M.L. (NVR 102) Qu. 2 level 5 "I guess Beowulf was under God's power and he might have God's power and feelings in him."

G.P. (NVR 133) Qu. 3 level 7 "Why did Beowulf like vengeance? Because he like fighting?"

I.W. (NVR 123) Qu. 2 level 8. "We can guess this is vengeance .˙. he is a hero. He fought against evil. This is a story of vengeance."

H.C. (NVR 97) Qu. 2 level 7 "I guess Beowulf was clever and good at fighting Therefore, he liked fighting."

C.B. (NVR 96) Qu. 2 level 8 "I guess that Beowulf is the strongest person of all .˙. he must of been one of the most popular people of all. No-one probably wanted to kill Grendel .˙. they must of been glad they had got Beowulf."

E.S. (NVR 129)"Beowulf was a warrer. He would be faynus. Therefore people could be herowic. Did he hang up Grendel's body because the people thought a spirit might come to claim it?"

In their written responses to Unit 4 Test 5 then, children in both the control and experimental groups attempt to make sense of the difficult language. (Margaret Donaldson (1978) found that very young children rarely discuss the meanings of words, and accept nonsensical interpretations of a story.) They also discuss the significance of a piece of written evidence from Saxon times. However, although both groups are aware that Beowulf is a legend, which is partly true, the control group children are more inclined to accept it at face value. They are less likely than the experimental children to try to explore the relationship between fact and fiction, and so less likely to see the story as representing feelings and ideals which lay at the root of the society's values: the fear, bravery, pride, courage, fighting, supernatural power, beliefs, vengeance of people settling in new lands. These concepts are all mentioned in the experimental children's answers quoted above. The concepts underlined had all been selected and taught to the experimental groups. It seems that because the received knowledge of the experimental groups revolved around concepts learned through discussion, they were able to produce a variety of suggestions about what Beowulf may have meant to people at the time and to begin to understand the feelings and attitudes at the root of that society.

D4

Analysis of Oral Evidence Tests

Comparison of the Led and Unled Discussion Groups. Unit 4.

As in Units 1 and 2, there was real discussion and problem-solving in both the led and unled groups. Again, the content of the discussion was similar. Both groups considered how things were made and used and what they may have meant to people at the time. In the map question, they observed the physical characteristics and the effects these would have on settlers in the area. Both groups made considerably more points at levels 3/4 and 7/8 than they had in the previous two units, and they made fewer illogical points. In Unit 4, the unled groups, for the first time, made more points at level 3/4 than the led groups. There continued to be a difference in the way the led and unled groups made their points. The led groups still tended to make general statements, while the unled groups expressed them through examples of stories and images. Some examples will illustrate the difference in expression.

Test 1. Unled Group

"Maybe the Sceptre was locked in a special room and only used on special occasions." "Displayed in the king's tent." "A symbol of power over the community."

Led Group

"It's too good to use in battle. It's a symbol."

Test 2. Unled Group

"Maybe they (in the picture of harvest) are the king's slaves. They just have a house and a cow." "They seem to be working long hours. It would be hot and tiring if it's summer."

Led Group

"Maybe they are giving money to the Lord. The writing would tell us how much different people give him."

Test 3. Unled Group

"I wonder if the priest wore long robes - like monks - with hoods and sandals?" "A bit tatty." "No, some were finely braided." "Is there a chapel for children?" "A place for old people?" "Cellars?" "Did they have Holy water? I wonder how many babies were Christened in church?"

Led Group

"I wonder where the altar was?" "The entrance?" "Were there steps?" "What did they do in Church?"

Test 4. Unled Group

"They might have had to walk a long way...all the settlements are about 2½ miles apart." "They had to travel a long way in not very good carts..not very fast.." "They probably had big carts like chariots to carry the whole family." "With a cabin like a boat!" "They wouldn't go anywhere though!"

Led Group

"How did they get from place to place?" "Probably by cart." "Or a boat." "It's easier than walking because of the forests."

Test 5. Unled Group

(Discussion of friendship and fear of the unknown, represented in Beowulf.)

"If we saw a group of people coming down the road we'd think they're friends. Saxons might say, "Oh dear, we'd better get our weapons ready." " "If someone comes into your house at night you'd probably hit him on the head. But they unleashed their swords and - SLASH!" "Grendel may have been quite useful. You know - when people do things wrong they need to be punished..."

Led Group

"Heroes saved people from being killed - from being attacked by other tribes." "The Saxons might have been frightened." "They might have killed a monster, but not one like that!" "They're describing how they feel."

Table (i)

Table showing the total number of points scored at each level by led and unled discussion groups in Units 1, 2 and 4 (Points refers to statements made).

	1/2		3/4		7/8		9/10	
	led	unled	led	unled	led	unled	led	unled
Unit 1	11	13	76	62	61	37	22	2
Unit 2	16	13	84	61	80	46	40	16
Unit 4	5	10	109	134	151	113	24	14

The table was made from synopses of tables recorded in diagramatical form (see Appendices XXVIII, IXL).

The table shows (i) a decline in the number of illogical points made at levels 1/2 in the led and unled groups in Unit 4.

(ii) a considerable increase in the number of points made at levels 3/4 and 7/8 by both led and unled groups.

(iii) Whereas in Units 1 and 2 and unled groups made less points than the led groups at all levels, in Unit 4 they made more points than the led groups at the 3/4 level.

A Comparison of the Content of the Led and

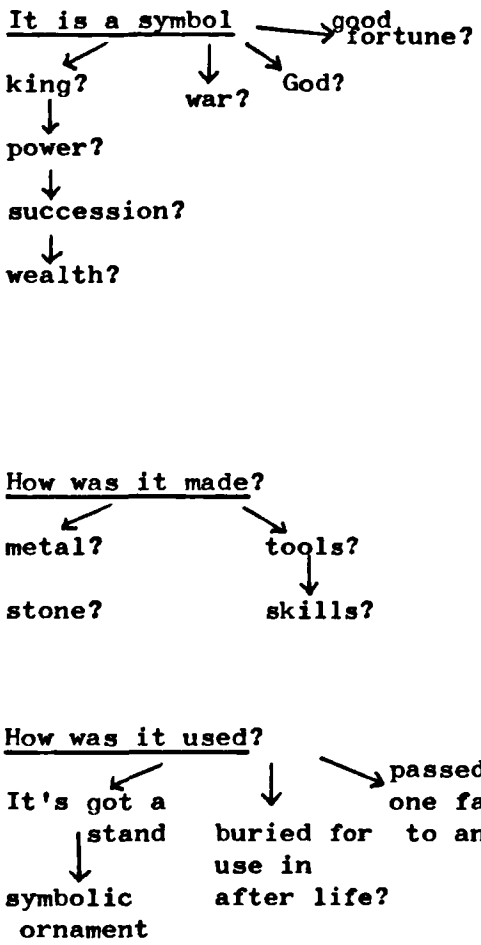
Unled Discussions in Unit 4

Diagram 3 (a)

Experimental Group 1

Led Discussion

Test 1. Artefact. The Sutton Hoo Sceptre



Experimental Group 2

Unled iscussion

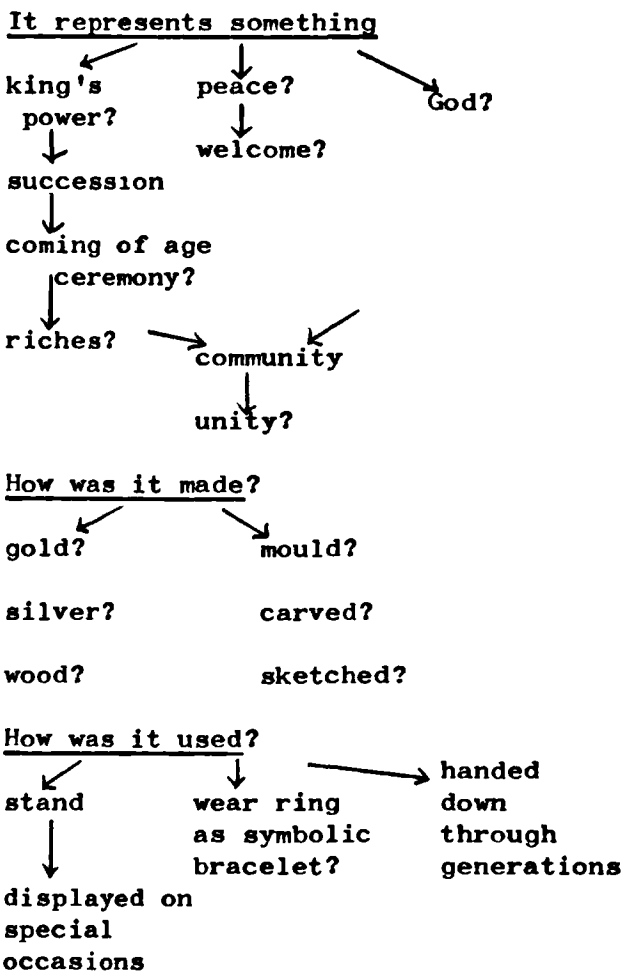


Diagram 3 (a) continued/1

Experimental Group 1

Led Discussion

Experimental Group 2

Unled Discussion

Test 2. Illuminated Picture of Harvest from Saxon Calendar

How was it used?

↓

show time to do things?

↓

to communicate?

How was it used?

↓

To remember something to do with Harvest?

↓

list of jobs to do on the land?

How was it made?

↓

some people could write/read

↓

they could help others

How was it made?

What did it mean to people at the time?

social order?

↓

laws/rules?

↓

taxes?

trade?

What did it mean to people at the time?

letter or will?

diary?

prayer?

king's records?

↓

story of king's life?

↓

tax/rent?

story - like Beowulf?

Diagram 3 (a) continued/2

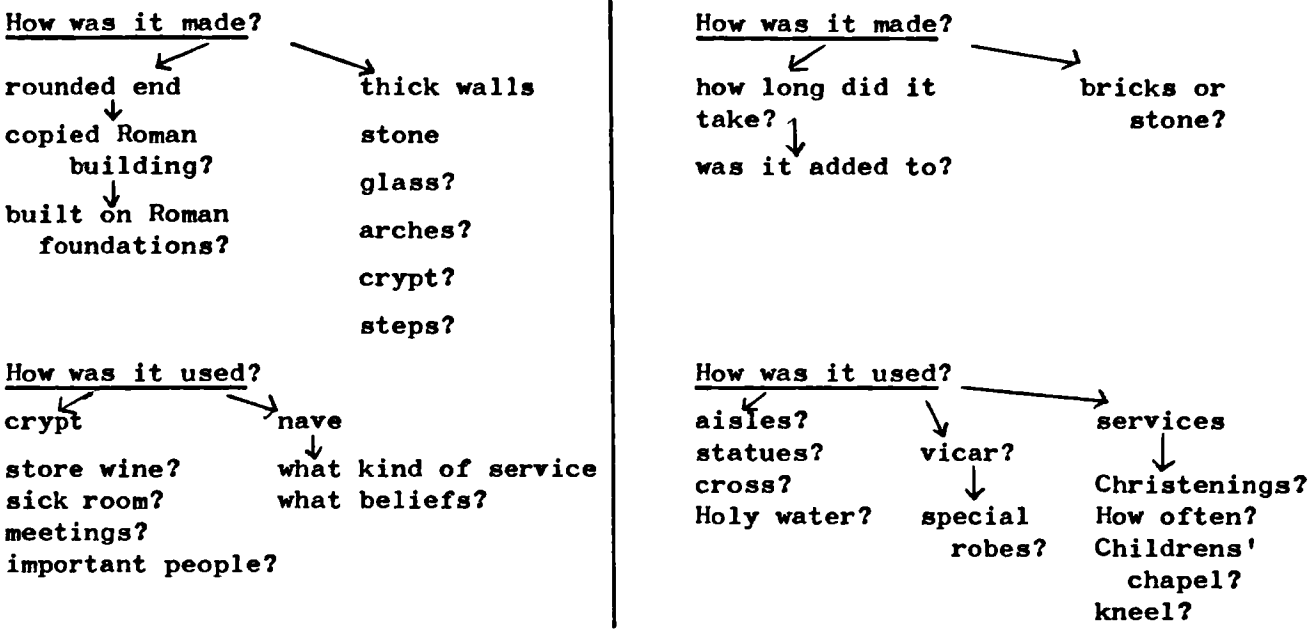
Experimental Group 1

Led Discussion

Experimental Group 2

Unled Discussion

Test 3. Diagram. Plan of Saxon Church at Cirencester



Test 4. Map of the Croydon Area in Saxon Times

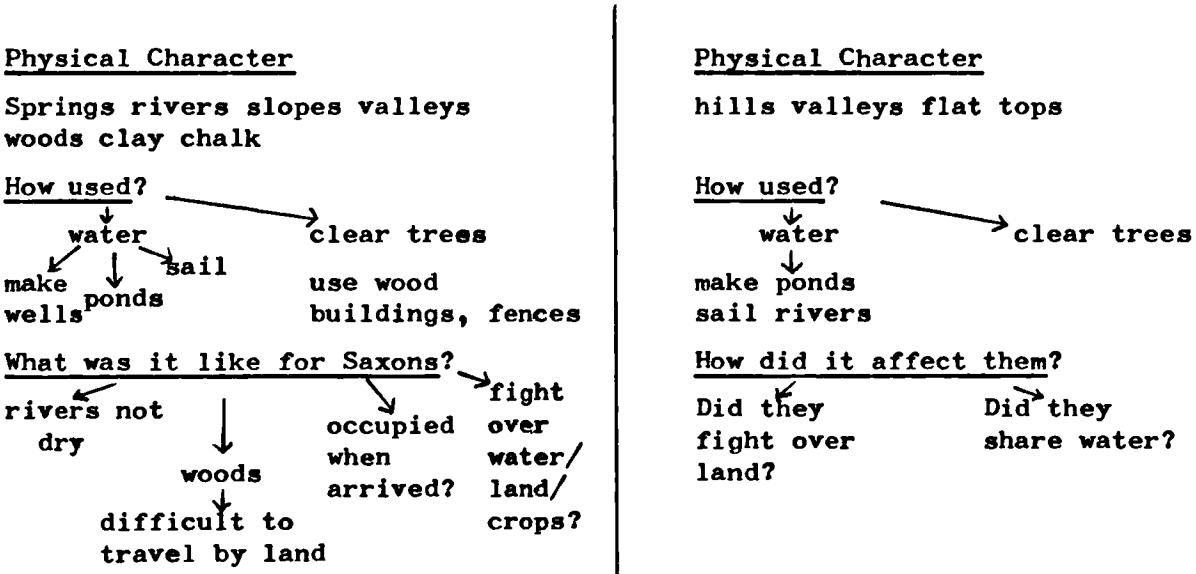


Diagram 3 (a) continued/3

Experimental Group 1

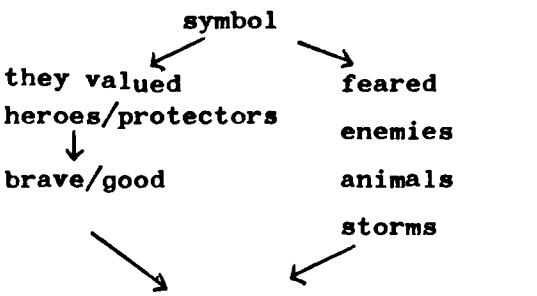
Led Discussion

Test 5. Excerpt from Beowulf

How was it written?

about Denmark
↓
brought to England
↓
passed on for long time then written

What did it mean to people at the time?



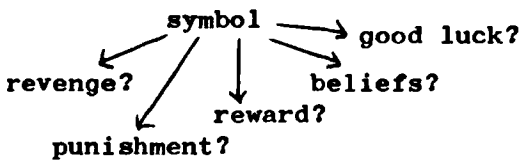
Experimental Group 2

Unled Discussion

How was it written?

used hard words
↓
language 'passed down'

What did it mean to people at the time?



D5

Analysis of the Empathy Test. Unit 4.

The children's answers fall into the four categories described in Chapter Two (F2). At level 1 there is no recognition that Christianity may symbolise new values; adopting the new religion was accidental. At level 2, it is assumed that people accept Christianity without reflection because the chief priest does. At level 3, there is some understanding that a choice has to be made. At level 4, some idea is expressed that Christianity involves a new set of values; there is mention of 'punishment for sins', 'forgiveness', 'protection', an end to anxieties, good and evil, and of personal significance. In Unit 1, no answer was categorised as level 4, four answers were in Unit 2, and five in Unit 4. It is possible that it is easier for children to discuss values and beliefs of a religion which they have been taught to understand. It is interesting that M.H. is a Muslim and he questions the expediency of adopting Christian beliefs.

As in the previous two units, children with lower NVR scores tend to operate at level 1, and those with higher scores at level 4, but there appears to be only a loose correlation.

Analysis of the Empathy Test. Unit 4. (Exp. 2)

The children were read an extract from Bedes' 'History of the English Church' in which King Edwin of Northumbria consults his chief men about accepting Christianity. A.D. 627. (Appendix XXXIX)

"Write a story to explain why King Edwin and his councillors became Christians."

Synopses of Stories

Level 1. Accidental (People are bored with the old religion and could do with a new church. Sparrow has no symbolic significance.)

NVR Scores

111 K.B. "I am bored with the old religion," said the King. "I want a new religion."

99 K.G. "Oh no, my best tempull. Oh well, there are bad things in our life....Now the church has burned down people should become Christians.. they could build a new tempull."

88 N.T. In a small hall everyone sits round the fire.. they can hear the rain and the wind..a sparrow flies through, over the flames, and out. Everything is quiet.

Level 2. Matter of Fact (People simply became Christians because Coifi did - no attempt to discuss values or beliefs.)

100 J.H. Coifi agreed that he would try this new thing. A few days later he went a bit nutty and set fire to all the temples in the land...some tribes fought against him and the Christians won.

128 A.W. You have not tried the Christian way of life. You should give it a go...and in the end they liked it.

111 L.W. ...Coifi said, "I am a Christian and all of you will become one because I am the priest" and every Sunday they went to church...

88 J.K. I was in the wood...a lady called out...I thought it was a spirit...I ran back to the hut...I became a Christian.

79 J.F. He burned down the temple because he believed in the new religion. Coifi said, "Who wants to go back to the old religion?" Then the king came to the window to see hom many people put their hands up. 10 put their hands up. 5 stuck with the old religion.

Level 3. Detailed Matter of Fact (Recognition of two points-of-view)

105 R.F. Some people said "I do not agree with this insult. The Gods will not be pleased with this other religion. You will be punished. It's Coifi's fault. This Christianity will not last. Our Gods will break it up." Then a big cheer went up. "Yes, we want to be in this new religion."

115 S.K. Coifi went to the Church and prayed that the new religion would be more useful.

117 M.F. It's Coifi. He is headed to the temple and beyond. He says, "I have burned away the old religion." People shout, "He is mad. He is crazy." He is stoned. Years later in a Christian church, "Dear God, you are the only God..."

Level 4. Significance (Some understanding that Christianity offers a new set of values and beliefs.)

120 D.F. The idols will punish you for your sins... start a new life and God will forgive you. "God will protect you," said Chad...

125 F.B. The old gods did nothing we asked. Now we would like to know about the Christian religion. "Will it give us anything?" said Osbert. If we pray for food and drink will we get it? "All dreams will come true. You need not worry about them again..."

111 K.C. ...But would God care about me and make me happy?....at the word 'Spirit', Tuda went all trembly and said, "What sort of spirit, good or evil?" I spoke to many people...it is not easy to change to a new religion.

120 J.G. If this new religion can tell us about the future, we will accept it....

135 M.H. "Coifi the chief priest is mad ," came the chant. What happens if their (i.e. Christian's) medicine does not work? What happens if their God has heavier punishments? Will he give a second chance and reincarnation as our Gods do? Will he sink ships that have bad men in them? What happens if he can't cure drought, or illness, or famine?

CHAPTER FOU

DISCUS ION OF THE FINDINGS

A. WRITTEN EVIDENCE TE TS

A1. STATISTICAL ANALYSES

A1. (a) Main Effects

(i) Difference between groups

(ii) Differences betwee the three types of questi n

(iii) Differences between the five types of evidence

(iv) Significant interactions in the main effects

A1. (b) Improvement over Four Units. A Comparison of the Three Group

(i) Main Effect A

(ii) Main Effect B

(iii) Main Effect C

(iv) Significant Interactions

(v) Analysis of Covariance to Remove the Effects f Intellectual Ability on Differences between the Groups

A2. CONCLUSIONS

B. THE ORAL E ID NC T STS

B1. CONTENT

B2. A GUM NT

B3. STRUCTURE

B4. A C MP ISON OF WRITTEN AND ORAL VIDENCE T TS

C. C NCEPTS

C1. T GHT CONCEPTS USED IN WRITTEN VID NCE T TS

(i) Concepts taught in each unit used in written vid nce tests at end of unit

(ii) Concepts taught in one unit and used in wr'tt n evide ce tests in subsequ nt units

C2. T UGHT C NCEPTS USED IN ORAL EVI ENCE TE TS

D. THE EMPATHY TEST

Written Evidence Tests

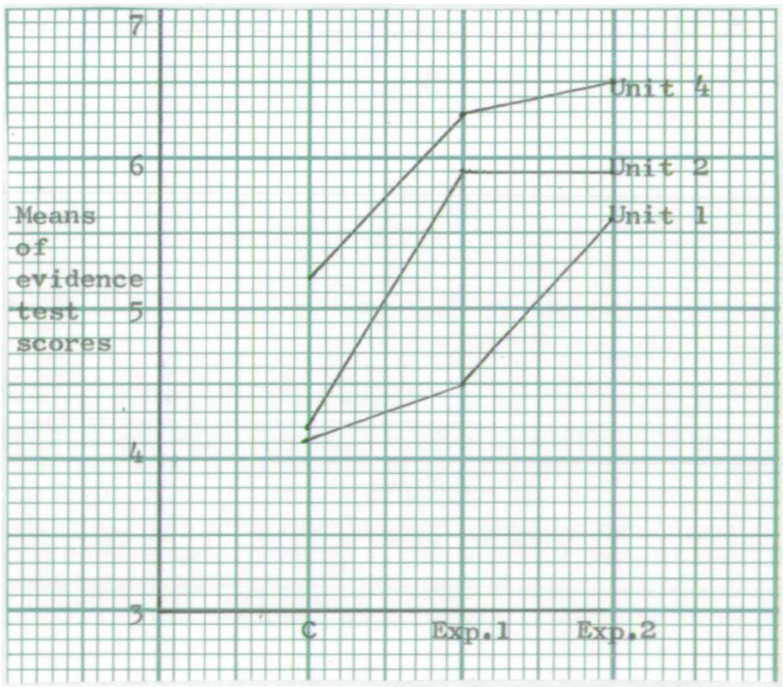
Statistical Analyses

(a) Main Effects

(i) Difference between groups

In Units 1, 2 and 4, there was a significant difference between classes. In Unit 1, the mean for experimental group 1 was slightly above that for the control group, and the mean for experimental group 2 was considerably higher. By Unit 2, the mean for both experimental groups was the same: 5.9 compared with 4.2 for the control group. In Unit 4, although the means for all three groups were higher than in the first two units, the means for the experimental groups were much higher than the control group mean. The Sheffé test for multiple comparison showed a significant difference between the experimental groups and the control group by Units 2 and 4.

Fig 4 (i) Graph showing means of evidence test scores for control and experimental groups for Units 1, 2 and 4.

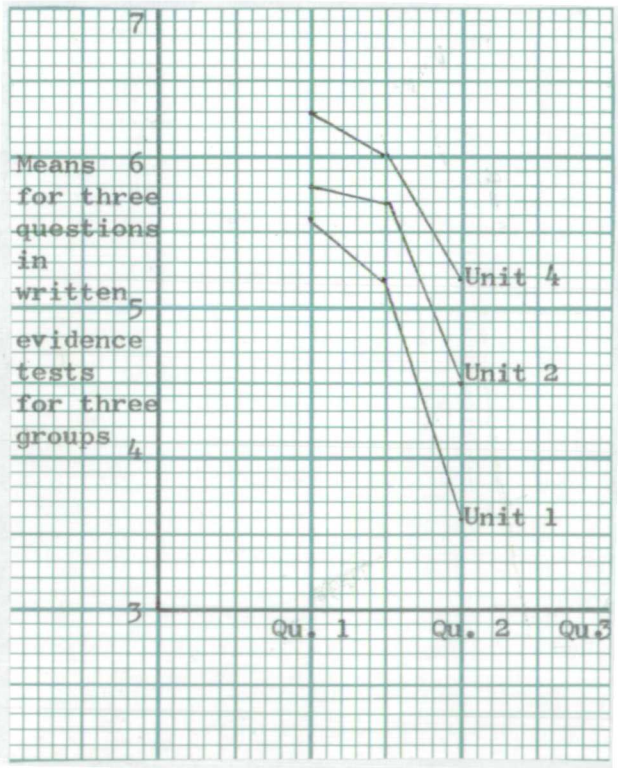


(ii) Differences between three types of question:

1. What do you know for certain?
2. What can you guess?
3. What would you like to know?

In each Unit there was a significant difference between the types of question. The graph of the means (Fig 4 (ii)) shows that question 2 was slightly more difficult than question 1, but question 3 was considerably more difficult. The Sheffé test of multiple comparison shows the difference between the first two questions and question 3 to be significant.

Fig 4 (ii) Graph showing means of scores for questions 1, 2 and 3 for Units 1, 2 and 4.

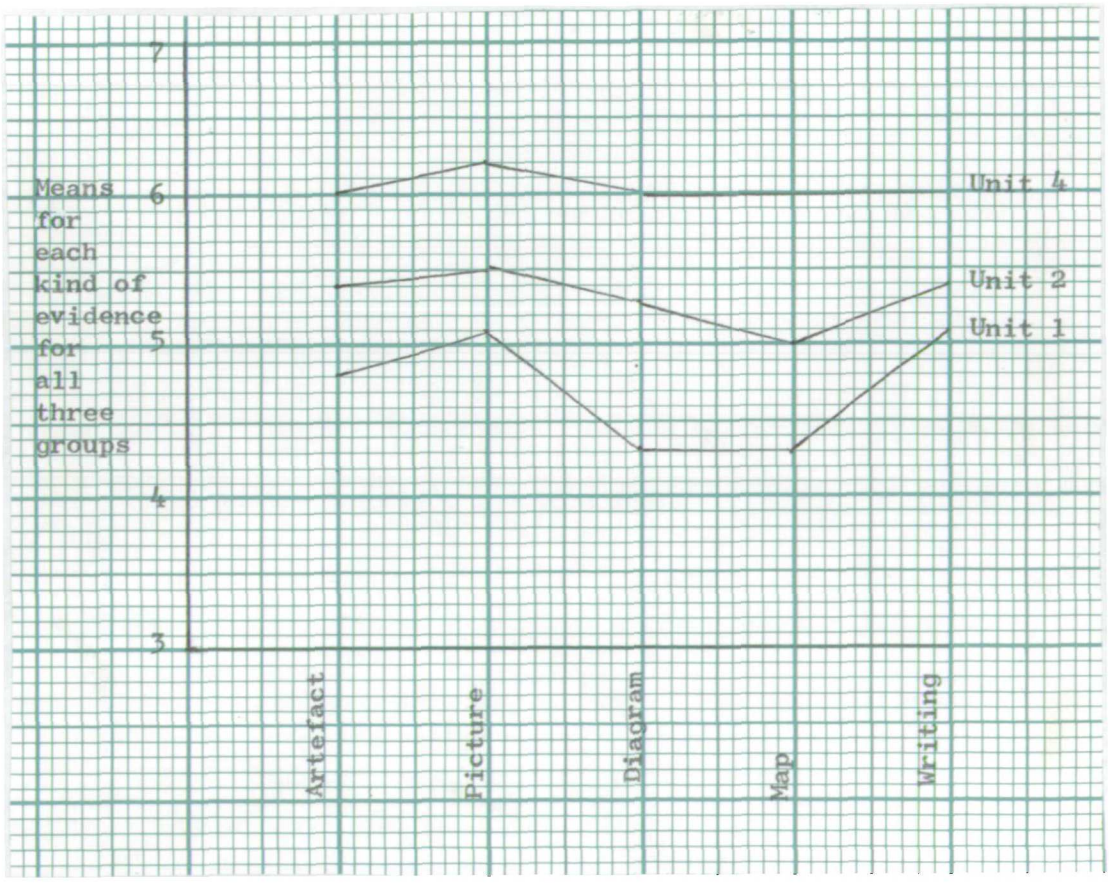


(iii) Differences between five types of evidence:

1. Artefact
2. Picture
3. Diagram
4. Map
5. Writing

In Unit 1, there was a significant difference in response to the five types of evidence. The diagram and the map were found to be more difficult than the other kinds of evidence. However, by Unit 2, and again in Unit 4, there was no significant difference in levels of response to the different kinds of evidence. This is probably because, firstly, the experimental groups had learnt to relate abstract evidence, (diagrams, maps and writing) to other more concrete evidence, as part of a continuum, and secondly because, having learned the kinds of responses required, the level of response depends on language, on concepts and argument, rather than on the nature of the evidence itself. Remains from the past are only evidence to the extent that they can tell us about the people who made and used them, that they can be interpreted.

Fig 4 (iii) Graph showing means of scores for five types of evidence for Units 1, 2 and 4.



(iv) Significant Interactions in Main Effects

However, the main effects are not pure. There are significant interactions which must be taken into account. The three groups do not always respond in the same way, to either the questions or the type of evidence. There is not always a parallel response from the two experimental groups. This shows that levels of response are influenced both by particular examples within a kind of evidence, and by the personalities, interests and motivation of groups of children. These interactions have been discussed in the analysis of each unit. In Unit 1, for example, there are significant interactions between the groups and the types of evidence. Experimental group 1 found the cave-painting easier to interpret than the axe-heads, unlike the other two groups. This was probably because children in this group had poor concentration and the painting arrested their attention more easily. The control group found the map difficult because they had not visited a similar site. There are also interactions between the questions and the types of evidence. The children found it more difficult to guess about the axe-heads, than to say what they knew for certain. This is not surprising since knowledge of how stone tools and weapons were made nd used is central to a study of the Stone Age, and the experimental groups had a demonstration of this at Grimes Graves. In Unit 2, there is a significant interaction in the way the three gr ups respond to the different que tions.

Although the main effect found knowing easier than guessing, the control group and experimental group 1 found knowing slightly more difficult. This is probably because experimental group 2 were highly motivated, and better at recalling

/cont....

information they had learned. In Unit 3, interactions between questions 1 and 2 for all five types of evidence show that there is little difference between 'knowing' and 'guessing', although an interaction between questions and gro ps shows that experimental group 2 again finds 'knowing' easier than the other two groups and that the control group find it difficult - possibly because they had been given less information.

An interaction between groups and types of material in Unit 4 shows that while the experimental groups found writing (the Beowulf extract) hardest, the control group found it slightly easier than the other kinds of evidence. Maybe this was because they were more used to comprehension exercises than to interpreting historical evidence.

(b) Improvement over Four Units. A Comparison of the 3 Groups

The main effect for differences between groups (Fig. 4 (i)) showed that the mean for the control group scores had improved between Unit 1 and Unit 4. However, in each Unit, the mean for the control group was lower than the mean for either of the experimental groups. The mean for the experimental groups improved in each Unit. Experimental group 1 improved considerably between Units 1 and 2, although they never performed quite as well as experimental group 2.

In order to analyse this difference between the groups and the improvement between Units 1 and 4, an analysis of variance was used. This was a three-way repeated measures design (two between, one within). The groups were the first main factor (A). The repeated measures were artefact (B), the three levels being the three Units, and the three types of question (C). (Artefact was taken, as a design which contained all five types of evidence would be too complex). The results are given in full in Appendix XLVI(vii).

Table 10 Analysis of Variance table repeated measures design across Units 1, 2 and 4, one between groups, two within groups (repeated measures, artefact, 3 levels = 3 questions and 3 units).

ANALYSIS OF VARIANCE TABLE

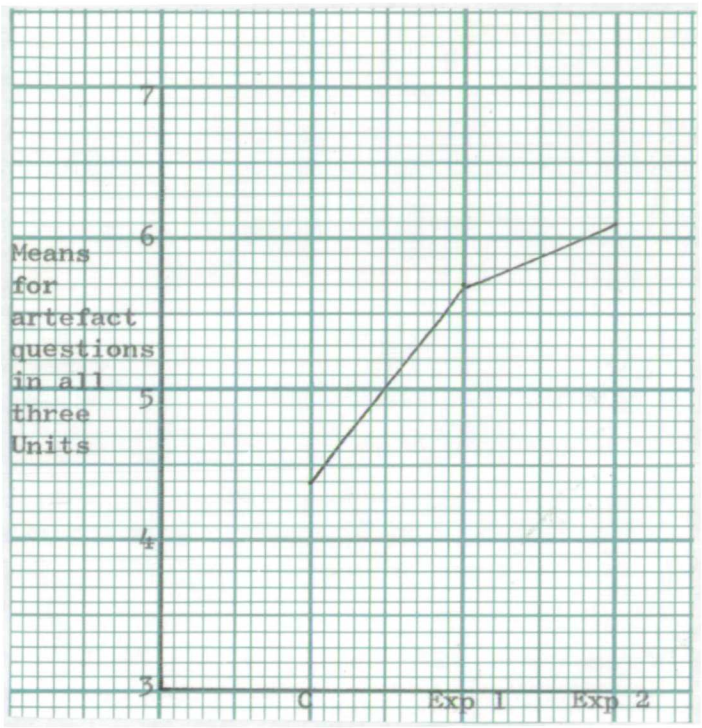
SOURCE	SS	DF	MS	F
BETWEEN SUBJECTS	990.71	59		
Main Effect A	303.43	2	151.72	12.58
Error for A	687.28	57	12.06	
WITHIN SUBJECTS	1996.89	480		
Main Effect B	136.90	2	68.45	16. 6
Interaction A x B	126.23	4	31.56	7.54
Error for B	477.09	114	4.18	
Main Effect C	299.41	2	149.71	69.27
Interaction A x C	35.76	4	8.94	4.14
Error for C	246.39	114	2.16	
Interaction B x C	88.42	4	22.11	9.34
Interaction ABC	46.94	8	5.87	2.48
Error for BC	5 9.75	228	2.37	
Total	2987.60	539		

(i) Main Effect A There is a significant difference between the groups

(F = 12.58 df 2, 57 p< .05)

The graph of the means for each group (Fig 4 (iv)) shows that the experimental groups are both considerably better than the control group.

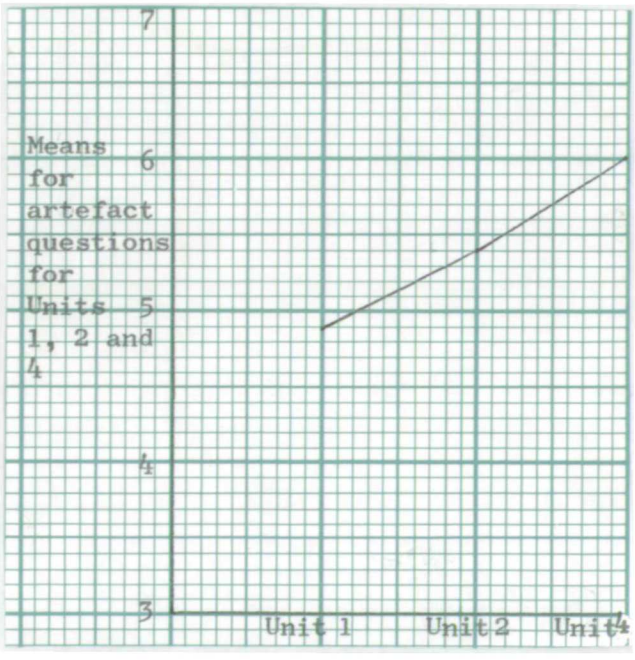
Fig 4 (iv) Graph showing means for control and experimental groups for the artefact questions, in Units 1, 2 and 4



(ii) Main Effect B There is a significant difference between the three Units. The means show an improvement in response levels over the three Units (Fig 4 (v)).

(F = 16.36 df 2, 114 p< .05)

Fig 4 (v) Graph showing means for Artefact questions in Units 1, 2 and 4

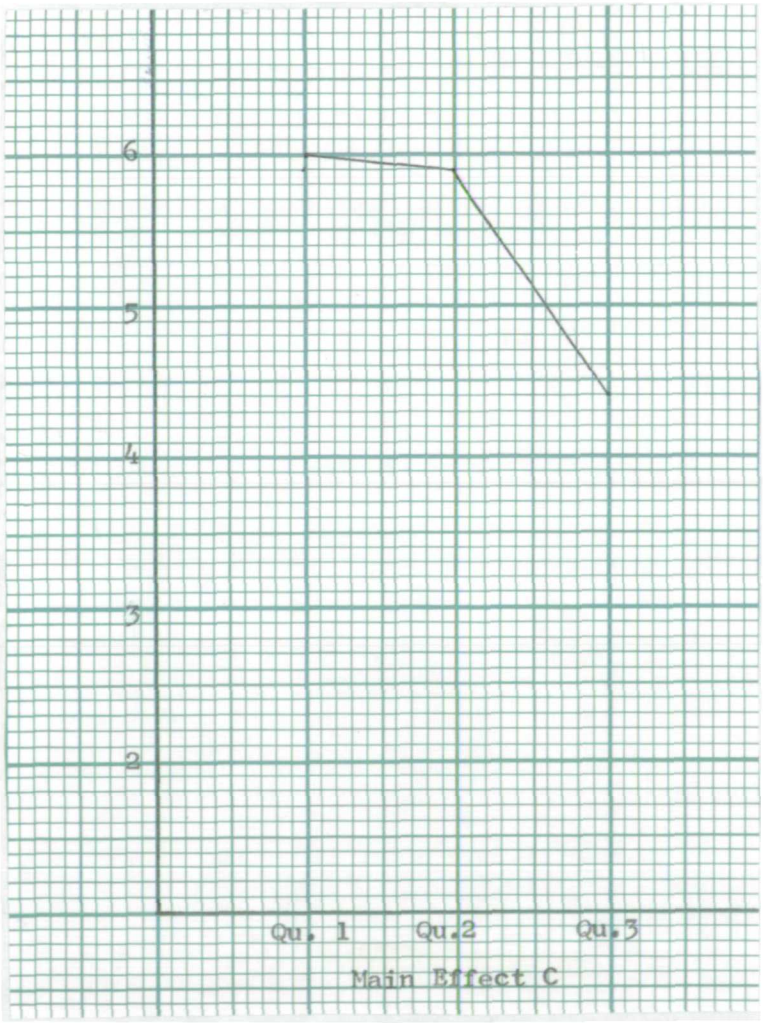


(iii) Main Effect C There is a significant difference between the levels of responses to the three types of question.

($F = 69.27$, df 2, 114 $p < .05$)

The graph (Fiv 4 (vi)) shows that this is because question 3, (what would you like to know?) is far more difficult than the first two questions (what do you know, and what can you guess?).

Fig 4 (vi) Graph showing means of scores for each of the three questions, about the Artefacts, in Units 1, 2 and 4.



(iv) Signific nt Interactions

However, although the main effects of the analysis of variance of the artefact questions over Units 1 to 4 show firstly that the experimental groups perform at a higher level than the control group, secondly that there is impro ement in levels of response over the four Units, and thirdly t at t e third question is far mor difficult than the first two, these eff cts are not pure, because t re are significant interactions b tween the groups and the Units (AB)

(AB) ($F = 7.54$ df 4, 114 $p < .05$)

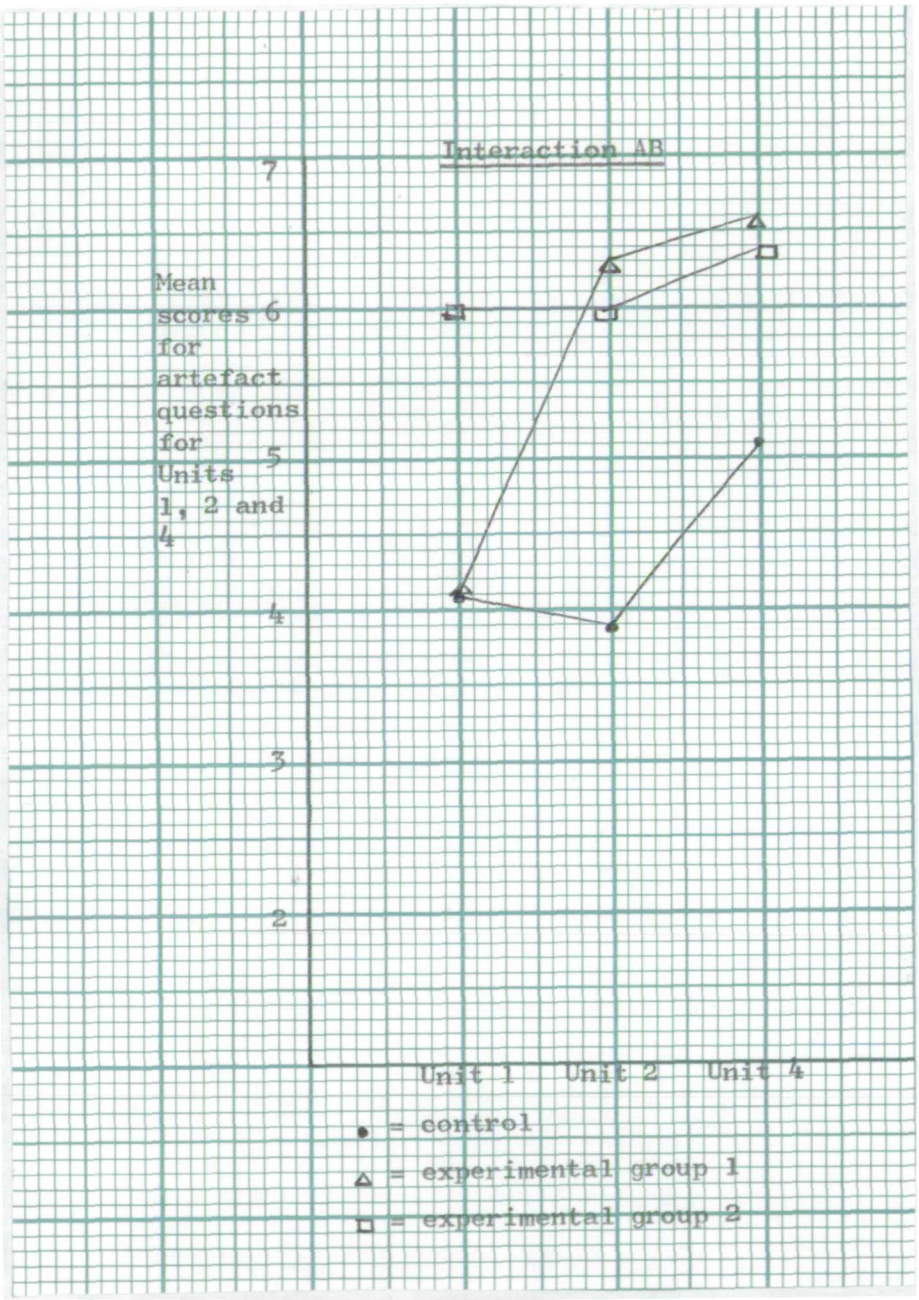
and the Units and the types of questions (BC)

($F = 9.34$ df 4, 228 $p < .05$).

AB

Plots of the m ans for interaction AB (Fig 4 (vii)) show that the groups do not all improve over the four Units in the same way. Experimental g oup 2 only slightly improves, probably because these children worked at the'r optimum level throughout the course, whereas experim ntal g oup 1 improved dramatically etween Units 1 and 2, as they became accustomed to my methods and expectations, and in Units 2 a d 4, they performed at a slightly higher level than experimental group 2. The control group deteriorated sl'ghtly between Units 1 and 2, but improved by Unit 4, although they remai ed well below the exper'm ntal groups.

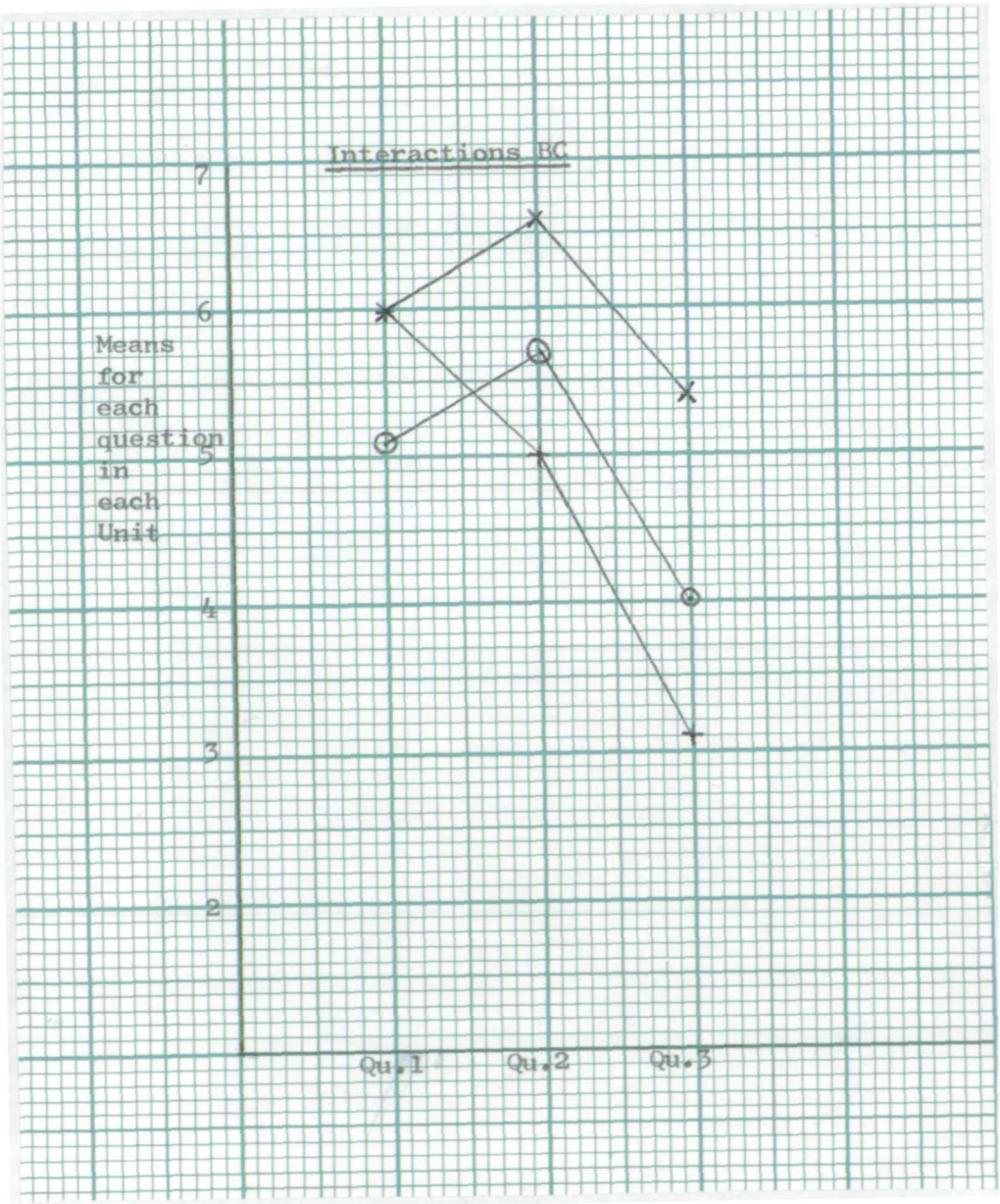
Fig 4 (vii) Graph showing means for each group for the artefact questions in Units 1, 2 and 4



BC

Plots of the means for interaction BC show that in Units 1 and 4, question one was found to be easier than question 2, although the main effect for all three Units shows it to be more difficult. However, it has been seen that there is little difference between levels of response to knowing and guessing; in this case 1 point on a 10 point scale. In marking, the distinction is not always clear.

Fig (viii) Graph showing means for each question about the artefact in Units 1, 2 and 4



(v) Analysis of Covariance to Remove Effects of Intellectual Ab'lity n D'fference betw n th Groups

It was stated in Chapter Two that althou h th re is no significant difference between the means of the Grou s' NVR ores, there were variations between the groups in the range of scores, and s'nc the grou w re intact, analyses of cov riance were used in order to remove the effects of ability and so increa e the precision of finding any difference between the responses of the three groups.

The analysis of covariance on the first qu sti n for each Unit (B: the repeated measure) across the three groups (A: control and experimental groups), shows that differences between the levels of response of the experimental groups and the c ntrol group, which became increasingly marked from Unit 1 to 4, was not due to any difference in ability. The analysis of variance shows a strong significant difference (F - 12.30 df 2.57). This exceeds the tabulated value, F = 3.15. (12.30 would only be found less than 1 in 1,000 times). The covariance analysis is better (F = 17.06 with 2 and 56 df). (Chapter 2, tables 5 and 6).

A2
Conclusions

Main Effect A. The difference between groups

The higher levels of response found in the experimental groups, after the effects of intellectual differences were removed, strongly indicate that teaching strategies which show children how to develop arguments about evidence, using specialised vocabulary, are effective in enabling them to do this. The improvement in res onse levels over the four Units suggests that children's skills in interpreting evidence can be increased through systematic experience; the improvement was greatest in the case of the initially poorly motivated group. The improvement in the control group's responses by Unit 4 shows that, irrespective of teaching strategies, they impr ved as they learned the thinking patterns required by the tests.

Main Effect B. The difference between questions:

What do you know?
What can you guess?
What would you like to know?

The similar levels of response for questions 1 and 2 showed, firstly, that children are able to make a distinction between what they know for certain, and valid suggest ons. Secondly, they show that children are able to make valid suggestıons, within publicly accepted criteria. Thirdly, the interactions between questions 1 and 2, and between these uestions and groups or types f evidence shows that, in spite of a maın effect w ·ch shows knowin to be slightly easier th n guessin , there is not in fact much dıff rence in children's ability to do either. This finding endorses the conclusion to main effect A, that teaching strategies based on open-ended d scussion dev lop children's historıcal understanding. Children can learn to make valid probabilistıc d ductions about evidence.

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/cont....

Main Effect C. The difference between types of evidence:

artefact
picture
diagram
map
writing

In Unit 1, the main effect showed that children found the more abstract evidence more difficult to interpret, but as the Units progressed the distinction between levels of response to different kinds of evidence disappeared. This was true even of the control group (graph 3 iii). It seems that level of response to evidence does not depend on the concreteness or abstraction of the evidence itself.

Interactions

The significant interactions which have bee discussed show that the groups do not always respond to either the materials or the questions in the same way, although the three main effects are strong, they are not pure. This indicates that the personalities, interests and motivation of children, and the nature of specific examples of a type of evidence can influence the level at wh'ch children respond, in making deductions about historical evidence. Such interactions need to be borne in mind in any attempt to design standardised models for assessment.

A3. DISCUSSION OF THE QUALITY OF RESPONSES TO THE WRITTEN EVIDENCE TESTS BY THE CONTROL AND EXPERIMENTAL GROUPS

The ten-point scale of assessment categories traces the early stages of deductive reasoning. However, a qualitative difference was noticed between the answers of the control and experimental groups, which was not reflected in this scale. In Unit One, the control group answers were often stereotyped and anachronistic, and tended to rephrase received information but not to go beyond it. In the experimental groups, children with a range of NVR scores were able to make a far greater number of valid supposals about the evidence. In Unit Two, this pattern continued, with the experimental groups asking a variety of specific, ordered questions about how things were made and used, and so coming to consider what they may have meant to people at the time. In Unit Four, it was shown that although both control and experimental groups brought their existing knowledge to bear on new evidence, the control group's hypotheses were less wide-ranging than those of the experimental groups, and the tendency to simply repeat given information often led to anachronism and a lack of understanding of the processes of change.

The analyses of the answers suggests three reasons for these differences. Firstly, the experimental groups had some 'direct experience' of the kinds of evidence they were given through visits to sites and museums, which they could internalise and from which they could transfer their arguments to new evidence. For example, they had visited similar sites to those shown in the maps. In Unit 1, Test 4, the experimental groups' answers refer to the geology, chalk and flint, and to the vegetation and animals it supports, and to the relief shown on the map, whereas the control group referred to general, stereotyped information about stone circles, caves, pictures on walls, the roles of men and children, and their 'hard life' which was not related to this piece of evidence.

The relationship between visit, class discussion and children's own ideas is analysed in Unit 2, Test 4.

Secondly, it seems likely that their experience of open-ended discussion enabled the experimental groups to recognise the possibility of a range of supposals, and to have some understanding of what constitutes a valid supposal, because misunderstandings had been revealed and clarified through discussion.

Thirdly, the experimental groups had discussed the nature of language as an objective tool for communication; they had discussed taught concepts, and they had learned to develop arguments. Therefore, the experimental groups were able to talk about the relationship between the written and spoken word, the symbolism of language, and to suppose how language originated and changed. In Unit 1, the control group answers, where relevant, revolved around 'smoke signals', whereas an experimental group child could say, for example, "They made signs for communicating; they had things to draw with; they needed other people." In Unit 2, the control group simply say, for example, "It was written by a Roman", whereas the experimental groups discuss the achievement of writing and wonder "How long after the Romans could the Iron Age write?" In Unit 4, the control group show less understanding of the relationship between fact and fiction or of the symbolism of the Beowulf extract. The experimental groups are also able to use abstract learned concepts as an organising framework against which they can test new evidence, even when they do not mention the concept itself. This helps them, in Unit Two, to make suggestions about trade, agriculture, metal production and the social structure. In Unit Four, discussing the sceptre, they talk about the king, ceremonies, symbols and laws; the illuminated manuscript raises questions about agriculture, the community, trade, crops and transport; Beowulf deductions involve power, vengeance

courage and beliefs. The higher written evidence test scores of the experimental groups reflect their ability to develop arguments.

The fertility of valid supposals found in the experimental groups, together with their resistance to anachronism and greater understanding of change, makes it possible for them to begin to understand what the evidence may have meant to the people who created it. The implications in the evidence, for example, the Iron Age House plan at Little Woodbury, and the lynchets at Butser, are explored to suggest what life may have been like in an Iron Age settlement: "Does the double row of posts indicate a chief's hut, or a storing compartment, or sleeping room, or a secret hiding place? Are they just to hold the roof up, and did the children play around them? Did families all own land? Was it fair? Who were the important people? How did they move crops around? What did they grow?" Such questions lead children to make supposals about different attitudes, behaviour and beliefs. The Waterloo Helmet may have a status or a ceremonial or symbolic meaning: "Maybe the more metal you had it showed how high up you were." "It may have been awarded for bravery in battle." "It may be an offering to a water goddess." "The patterns on it might mean..." The Uffington Horse may have symbolised strength, or a good harvest, been a warning to an enemy or a focus for celebrations.

This pattern is also seen in Unit Four. The illuminated manuscript and the map raise questions which range from the possibility of disease and back pains through carrying loads, quality and quantity of food, the distribution of labour and 'who is in charge' to the size of communities, and the need for water. Such questions lead to supposals about beliefs and values.

The sceptre, Unit 4, Test 1, may symbolise life. "The gold deer may be saying save our lives, or where we live." "It may commemorate the beginning of the earth." It may be a symbol of power: "It must be hard to be loyal to one person," or be a gift from supporters: "I guess he was a good king and a hard worker." Or it may represent succession: "I guess his father or grandfather crowned him.." Beowulf could have been "a lesson to people." "Maybe the people who made the story up wanted to be good." "Grendel may have been something they feared, but I shall never know." "I guess Beowulf was a symbol for fighting and braveness." "Why did Beowulf like vengeance? Because he liked fighting?"

Of course the children are limited by their immaturity and lack of knowledge, but in a very embryonic way, they are beginning to consider the ways in which people in the past may have felt, thought and behaved, and to explain why.

Appendices XLVIII-L show how in each test, children in the experimental groups consider how the evidence was made and used, and that this involves suggestions about the thoughts, feelings, attitudes, values and society of the people who made and used things.

B. THE ORAL EVIDENCE TESTS

B1. CONTENT

The content of the discussions was similar in both the led and unled groups (Unit 1, diagram 1a) Unit 2 p 234, Unit 4, diagram 3a). It was concerned with how the evidence may have been made and used and what it may have meant to those who created it, although the children had not at any point been asked to consider these aspects. However, there was a difference in the way the groups explained their points. The led groups tended to make general statements, whereas the unled groups gave more attention to physical description, and sometimes explained their ideas through vivid stories and images, about brave warriors who are commemorated by the stone circle, or who hid their treasure there and defended it.

B2. ARGUMENT

In both led and unled groups, there was genuine argument (diagrams 1b and 3a). The led and unled groups both made some illogical points at level 1/2; however, in the unled groups, they were either ignored or corrected, with respect, by another child. In the led group, it was usually the teacher who queried them. In both groups, children developed each other's points at level 3/4 and 7/8in each Unit. There was an improvement over the three units in the led and unled groups in the number of different points made, and in the number of sequential arguments at level 3/4 and 7/8, and a decrease in the number of illogical points made at level 1/2 (tables (g), (h) and (i)). The led groups were able to develop more of their argume ts than the unled group. In Units One and Two, they made more points at levels 7/8and 9/10. However, by Unit Four, the unled groups made more suggestions at level 3/4 than the led groups. This could indicate a difference between 'natural' levels and 'forced'levels.

B3. STRUCTURE

Synopses of all the discussions were recorded in a diagramatic form which made it possible to see how arguments were developed, and how sometimes the same point generated a range of further suggestions. (Diagram 1(b) and Appendices XXXVIII-IXL show how this was done). The diagrams show that the led groups tended to explore all the possibilities suggested by one point, then move on to the next point, whereas the unled groups usually followed up a point with one further argument, then made a fresh point. Sometimes, they back-tracked. Supposals were less systematically explored.

B4. A COMPARISON OF WRITTEN AND ORAL EVIDENCE TESTS

Analysis of Unit One suggested that the individual members of the led groups scored at a higher level of argument in the oral than in the written test, because in a group they could take each other's arguments further. This was less true for the individuals in the unled groups, because members were all keen to make a new point as it occurred to them, rather than develop a previous one. However, analysis in Unit Two shows how, in both the led and unled groups, points made by individuals in written answers are explored much more fully in a group discussion. In a led or unled discussion, children participate in making a wider range of supposals.

C. CONCEPTS

C1. TAUGHT CONCEPTS USED IN WRITTEN EVIDENCE TESTS

C1. (i) Concepts taught in each unit used in written evidence tests at the end of the Unit

In each unit, most of the concepts taught at all three levels were used spontaneously by one or more of the children in each of the experimental groups, in answering the written evidence tests at the end of the unit. In Units one and Two, the experimental group 1 used

less abstract concepts than experimental group 2, but by Unit Four, the groups were using similar numbers of concepts, and were using concrete, abstract and superordinate concepts (bar chart 3.1). The control group only used these concepts if they were either referred to in the evidence (e.g. clay, flint, circle), or were less specialised (tools, food, plough, thatch, monster, church). The analyses of the written answers suggest that the disposition to make a wide range of valid suggestions about evidence is criterial in the development of historical understanding.

It was argued in Chapter Three, in the Analyses of Unit Four, that one reason why the experimental groups made a greater range of valid supposals was because they had a conceptual framework of concrete, abstract and superordinate concepts, to which they could relate new pieces of evidence, even if the more abstract concepts themselves were not mentioned in the answer. Freedman and Loftus (1971) concluded that concepts play an important part in organising semantic memory. Therefore, it is possible that the gradual improvement in concept use in experimental group 1, partly explains why they made more progress than the control group and almost caught up with experimental group 2.

C1. (ii) Concepts taught in one unit and used in written evidence tests in subsequent units

In Unit Two, both experimental groups used concrete, abstract and superordinate concepts learned in Unit One (Table (b) bar chart 2.2). In Unit Four, both groups use concepts learned in the previous two units, at each level; experimental group 1 use superordinate concepts on 15 occasions (vegetation, belief, power, agriculture, transport, society, religion (bar chart 3.3)). In the control group only one child uses a superordinate concept in Units Two and Four (communication). Although no claim can be made that the experimental group children had a complete understanding of these concepts, it seems that they are becoming part of the children's own vocabulary. Moreover, no claim is

made that the given hierarchical levels are discrete, but since children are retaining and using concepts at each level, it seems that at least some of them have learned to abstract and transfer common characteristics in such concepts as tools or weapons, and to formulate some kind of rule from specific examples which enable them to use words such as vegetation, beliefs, power, agriculture, transport and society in a new context (bar chart 3.3).

C2. TAUGHT CONCEPTS USED IN ORAL EVIDENCE TESTS

In each Unit, both the led and unled groups use concepts at each of the three levels during their discussions. They also used concepts learned in previous Units when appropriate (bar charts 2.3, 3.2, and tables (c) and (d)). In each Unit, the unled groups used slightly fewer taught concepts than the led group. This may indicate the role of the teacher in promoting concept development through cueing.

D. THE EMPATHY TEST

This test was designed to investigate the idea that sympathy and projecting one's self into a situation may be a necessary stage in learning to understand why people in the past may have felt, thought and behaved differently. Lee (1984) suggested that this is unlikely but not impossible. The researcher assumed at the beginning of this study that historical empathy was a discrete competence, and could be investigated separately from hypothetico - deductive reasoning about evidence. The evidence used as the stimulus for the story, involved symbols of beliefs, and ritual. The assessment categories were a modified version of those used by Ashby and Lee (1987). The aim of the test was to see whether children could suggest explanations of ideas and beliefs in a way that reflected these levels, which range from an unawareness that societies have rules and beliefs and values (level I), a recognition that they exist without any attempt to

explain them (level II), a transitional level in which more detailed evidence of the period is employed in the reconstruction (level III), to attempt to explain the ideas and beliefs represented by symbols (level iv). The empathy test did reflect these levels, and also suggested some slight improvement in the levels attained.

However, as a result of this study, the researcher concludes that while it is not impossible that story-writing which encourages projection into the past could be a 'staging post' in developing historical understanding, children's immaturity and lack of knowledge makes it impossible to recreate an holistic picture of the past. Analysis of the evidence tests suggests that historical imagination and historical empathy are not discrete competences, but are a central aspect of the interpretation of evidence. Indeed, story-writing may encourage attempts at sympathy and identification, inadequately related to evidence, which could impede the growth of real historical understanding.

CHAPTER FIVE

IMP ICATIONS OF THE FINDINGS

A. IMPLICATIONS OF THE FINDINGS FOR TEACHERS

A1. INTRODUCTION

A2. EVIDENCE

(i) Different types of evidence

(ii) Different types of question

(iii) Discussion

(a) written and oral responses compared

(b) led discussion and unled discussions

A3. HISTORICAL EMPATHY

(i) Empathy through interpreting evidence

(ii) Empathy through story-writing

A4. HISTORICAL CONCEPTS

A5. EVALUATION AND ASSESSMENT

A6. TEACHING STRATEGIES

(i) Direct experience

(ii) Discussion

(iii) Integrated curriculum

A7. ACCELERATION

A8. NON-VERBAL REASONING SCORES AND HISTORY

B. IMPLICATIONS OF THE FINDINGS FOR FURTHER RESEARCH

C. CONCLUSION

CHAPTER FIVE

IMPLICATIONS OF THE FINDINGS

A. IMPLICATIONS OF THE FINDINGS FOR TEACHE S

A1. INTRODUCTION

This study was undertaken with a small sample (sixty children) in a restricted age-range (8-9 years). An effort was made to test evidence of similar levels of complexity in each of the units for the four periods studied, but it cannot be assumed that similar evidence for other periods would elicit similar levels of response. A high level of marker reliability was achieved (Table 1), but the other marker had spent time with the researcher learning how to use the marking scale. The main effects (tables 7, 8, and 9) were extremely strong, but there were interactions. For these reasons, the findings should be treated with caution. Nevertheless, there are implications for practising teachers.

A2. EVIDENCE

A2. (i) Different types of evidence

There is often an assumption that artefacts (or photographs of them), and pictures are easier kinds of historical evidence for young children to interpret than archaeological plans, maps or writing (and, indeed, that artefacts and pictures are less suitable for advanced students). This study modifies such an assumption in three ways. Firstly, although in Unit One the more abstract evidence appeared more difficult (Fig 1 (iii)), by the end of the fourth Unit, there was little difference in levels of response to the five kinds of evidence (Fig 4 (iii). It seems then that it is not reasonable to assume that children find maps and writing more difficult than artefacts and pictures (probably because in each case language is the tool of investigation).

Secondly, however, although the experimental groups found written evidence only slightly more difficult than artefacts and pictures, this was not true of the control group. They found writing easier than 'concrete' evidence (Fig 3 (v)). There seem to be two probable explanations. The control group probably had more experience of 'comprehension' exercises and so handled the written evidence with confidence. The experimental groups, however, increased their ability to discuss artefacts, pictures and maps because they had direct experience of discussing them, in lessons and on visits. They had discussed how Stone Age tools and weapons were made on their visit to Grimes Graves; they had discussed Iron Age armour in the British Museum; they had experienced a subsistance farming community at Aklowa; they had visited local sites of settlement in each period, and related these to maps, geology, vegetation and relief. They could, therefore, draw on these experiences in interpreting, for example, the Stone Age axe-heads, the Waterloo Helmet, the plans of the stone circle and Iron Age hut, and the map evidence. This suggests that children need to experience physical evidence, and learn to discuss it if it is to have any meaning for them. It shows, too, that if they have first-hand experience of maps and sites, they can transfer it to other maps and interpret location and settlement. It seems then that if children are exposed to a range of historical evidence, they can learn to interpret both the 'concrete' and the abstract. Experience of artefacts and sites and pictures is a stimulating starting point; experimental group 1, while poorly motivated, responded well to the cave painting. But artefacts and sites must also be used to teach patterns of thinking which can then be transferred to other maps and written evidence.

Thirdly, the interactions within a strong main effect show that different groups respond differently to the five types of evidence.

Variables such as interest, motivation and teaching styles influence their responses. This should be borne in mind in any attempt to design standardised tests on interpreting evidence.

A2. (ii) Different types of question

A strong main effect for the different kinds of question showed that children are able to distinguish between knowing and making valid supposals (questions one and two), and are just as able to make reasonable hypotheses as they are able to say what they know for certain. This has important implications for teachers. It suggests that children do not need to be restricted to repeating "facts", and that they are able to become actively involved in historical problem-solving, and to learn to control their own thinking. They can become increasingly aware of what constitutes a valid supposal. The charts (Appendices XLVIII-L) suggest that process of making a range of suggestions about how things were made and used often involves the process of making suggestions about feelings, thoughts and beliefs, and that this process makes it possible, in maturity, to achieve genuine historical empathy. Young children are capable of embryonic, but nevertheless real, historical thinking.

However, the main effect showed that question 3 (what would you like to know?) is by far the most difficult. The starting point is the unknown, and the question is too open. It does not encourage children to control their own investigation. This is significant because children are frequently told to "find out about...", particularly at the ends of chapters in history books. It is assumed that this encourages motivation and independent learning. These tests suggest that such a question is too unstructured.

A2. (iii) Discussion

(a) Written and oral responses

The wide range of supposals which are produced in a group, compared with an individual's written answer has three implications. Firstly, since the group discussions reflected the class discussions given in the lesson plans (Appendices IX-XII), class discussion is important in teaching children what constitutes a valid hypothesis, and the range of hypotheses possible. Secondly, in addition to class discussion, group discussions are a valuable teaching strategy in allowing all children to participate and to learn to support and develop their arguments (tables (g), (h), (i)). Thirdly, they are worth considering as a means of monitoring, evaluating and assessing children's thinking, rather than relying solely on written answers, because in a group, children may make more points or develop arguments further. Finally, if as this study suggests, a fertile range of suggestions leads to an understanding of other perspectives, discussion is of crucial importance in developing historical understanding.

(b) Led and unled discussions

This study suggests that both led and unled discussions have a place in teaching children to interpret evidence. Led discussions help children to develop arguments in a structured way, to explore points fully, to reveal misunderstandings (Appendices XXXVIII-IXL), and to use abstract vocabulary (bar charts 2.3, 3.2, tabl s (c) and (d)). Unled discussions, however, encourage them to correct each other, to express th ir ideas in their own ways,to internalise them, and so make them their own. They learn to clarify their thinking, and to achieve control over it. The unled discussions in this study show that if children have learned the thinking patterns required, their discussions cover similar content, and involve genuine argument, whether a t acher is present or not. This has implications for class room organisation and the value of unsupervised group work.

A3. HISTORICAL EMPATHY

A3. (i) Empathy through interpreting evidence

It has been suggested in Chapter Three, and in Appendices XLVIII-L that children begin to consider feelings, thoughts and values different from their own through learning to make a wide range of valid supposals about evidence. This implies, firstly, that the development of historical empathy is not a separate process from interpreting evidence, which may only be expected from older children, but is central to the integrated process of developing historical understanding, and is tied by accepted criteria to the interpretation of evidence. Secondly, to begin to learn this process of understanding is essential to the learning of history, because understanding the past involves understanding how historians come to write their accounts of it, and why these may differ and yet be valid.

A3. (ii) Empathy through story-writing

This study suggests that children enjoy trying to reconstruct the past through story-writing, that they do begin to consider and try to explain ideas and beliefs different from their own in doing this, and that there is a pattern in their developing ability to do so. However, children should be asked to "imagine you were...." and to write stories about the past with caution, because they are immature, their knowledge is limited, and they are unable to take an holistic view of society (Furth 1980). In writing stories, imagination is not necessarily tied so closely to evidence, and interpretati ns of evidence do not have to be argued, as they do in a discussion. Therefore, anachronisms and misunderstandings are more likely to go unchecked. (Historical fiction is extremely difficult to write).

Teachers need to show children how they can relate a reconstruction to evidence. David Sylvester (1989), shows how a seven-year-old can use

knowledge based on evidence from a pictorial source, interwoven with historical imagination, to write a story about the bubonic plague and the fire, and how a twelve-year-old can use directories, plans and logs to write about a day in the life of a Victorian boy.
Vivienne Little (1989) gives two examples of story-writing by ten-year-olds about Spain's conquest of the Inca. In the former, a different way of life, hierarchy and ceremony are understood, and factual information has been translated into a reconstruction. In the latter example, knowledge is thrown in, but without sense of time, or detail. At the moment, too many books ask children to write imaginatively without consideration of the evidence on which to base this, or the problems involved.

A4. HISTORICAL CONCEPTS

The children in the experimental groups seemed to acquire some understanding of time and change, similarity and difference, because these concepts were built into the lesson plan discussions. They were less inclined to anachronism than the control group. However, the concepts specifically examined were taught special concepts at different levels of abstraction (Appendices V-VIII). Children used these in their written and oral answers, and transferred them across the units. The learned concepts were seen, in the analyses of Units Two and Four, to provide them with a framework against which they could test new evidence; they related a sceptre to laws, kingship and beliefs; a map to agriculture, settlement and community. The control group, who could not do this, produced a more limited range of supposals and tended to repeat given information, sometimes inappropriately. This suggests that children's historical understanding is developed through deliberate teaching of selected concepts and that they are able to learn abstract concepts, as long as these are related to subordinate concrete concepts where possible (e.g. spear, weapon,

defence; emmer, crops, agriculture), and to specific examples, through discussion.

A5. EVALUATION AND ASSESSMENT

This study shows a variety of ways in which children's historical thinking was assessed and monitored. Hypothetico-deductive reasoning about evidence is assessed on a ten-point scale. This scale is also used to trace and evaluate group discussions. Diagramatic representations of the discussions based on this scale show patterns of deductive argument (Appendices XXXVIII (i)amd (ii)), which converted to tables ((g) and (i)), and other diagrams illustrate and compare the content of discussions.

Tallies of concepts used in writing and in discussions, are converted into bar charts, then tables. Assessment categories for levels of historical understanding in story-writing are used. There is also discussion of the relationship between hypothetico-deductive reasoning and empathy, and of the effect of learned concepts on both. There are many implications for teachers here. Firstly, since this study was undertaken as an integral part of class teaching, and refined the thinking of the researcher and the quality of her teaching in the process, it suggests that action research by practising teachers is both possible and desirable, and should therefore be supported and encouraged. Secondly, however, it is not necessary for such detailed analysis to be carried out all the time, or by all teachers; its purpose is to indicate broad patterns of development and the relationship between different aspects of historical thinking, which can form the basis of planning and on-going, informal assessment by teachers. This is more likely to improve the quality of teaching than occasional or externally imposed tests. Alan Blyth (1990) is optimistic about assessment in the humanities if teachers are able to take the initiative, particularly in on-going

formative assessment.

Thirdly, this study indicates the problems involved in creating standardised tests in history, for young children. Assessment was extremely time-consuming; the deductive-reasoning scale did not take account of the quality of historical understanding; skill, experience, and commitment were demanded of the markers. Interactions in the main effects indicate the impossibility of controlling all variables, even when using statistical analyses. The loose connection of history evidence scores with NVR scores suggests that skills in historical problem-solving do not proceed at the same pace, or in the same way, for all children, but proceed spasmodically in intertwining sequences. Therefore, summative assessment involving a comparison to the norm is relative, and statistically dangerous, and the problem with criterion referencing in which children are measured against an objective standard, is the difficulty of deciding on the criterion.

A6. TEACHING STRATEGIES

A6. (i) 'Direct experience'

The experimental group children were able to discuss the plans of a stone circle, an Iron Age hut, and a Saxon church, although they had not visited similar sites. However, they had visited sites of settlement during each period, and were able to transfer their knowledge of geology, vegetation and relief to the map evidence; it probably also influenced their interpretation of the plans. Although the significance of their visits to Grimes Graves, the British Museum and Aklowa cannot be isolated in the same way (because their influence could be directly traced, in the way that the visit to the site can be related to answers to the map questions), it seems likely the stimulus of the visits, to some extent, accounts for the experimental groups' ability to make a greater range of supposals about artefacts, e.g. axe-heads, or the Waterloo Helmet.

Certainly the finding that children can interpret evidence other than artefacts and pictures in no way suggests that visits to sites and museums are not very important. It suggests, on the contrary, that older students should be required to work from such evidence more frequently, since it is wrongly assumed to be simpler to interpret than written sources.

A6. (i) Discussion

This study endorses the importance of learning through open-ended discussion, through which children learn the thinking processes of history. They learn that many suggestions are possible, and remain uncertain, and that they must be supported and can be contested, and that this is how criteria for validity become understood. It seems likely that this is the most important factor in the difference between the control group and experimental groups' responses. Firstly, the experimental groups achieved both a higher level of deductive reasoning, and a wider range of valid supposals. Secondly, the control and experimental groups used the factual information they had in different ways. They were not required to rehearse it in their answers but, nevertheless, it underpinned their answers. The control group, however, tended to repeat information given, often only loosely related to the evidence, and when they went beyond it, often revealed misconceptions. The experimental groups were more likely to test given knowledge against the evidence. Their suggestions for example about the Anglo-Saxon sceptre were dependent on their knowledge of Anglo-Saxon kings and kingdoms, laws and succession.

It seems, th n, that discussion is important in the development of historical understanding. The lesson plans indicate too, however, that the discussion must be based on selected key evidence. Children need key factual information, but if they learn it through discussion, they do not simply repeat it, but they both retain the information, and

are able to transfer the pattern of discursive thinking to new evidence.

A6. (iii) The integrated curriculum

The benefits of learning history through an integrated curriculum with a strong history focus are not proven by this study. However, the links between the responses of the experimental groups to the history tests and other areas of the curriculum can be traced. From science, they seem to have learned both to question and respect the technology of other societies. They are more likely to discuss how things were made and used than the control group (e.g. the discussion of the Waterloo Helmet, Unit Two, Test 1, reflects their knowledge of iron smelting gained in Unit Two, lesson one). Their experience of historical fiction (The Changeling, R. Sutcliffe; The Dream Time, H. Treece) may well have helped children to recognise the difference between fact and imagination, to make supposals about evidence, and to weave them into stories. The study provided many examples of how children can relate experience of geology, vegetation and relief to settlements, can see how this information is represented in maps, and can transfer their deductive thinking to other maps. It probably also influenced their references to transport and trade (e.g. in Unit Two, Test 5), and to migration of peoples (e.g. Unit Four, Test 4 and Test 5).

Art taught the experimental groups careful observation through drawing (slides of cave paintings, Iron Age artefacts in the British Museum, or Anglo-Saxon pottery). It also seems to have taught them both an interest in the techniques and materials used in the past, and an understanding and respect for different interpretations. S.H. (Unit One, Test 2) guesses that Stone Age people kept their oxides in pots, and used their hands to paint. In Unit Two, Test 2, the experimental groups suggest why the Uffington Horse is unnaturalistic; in Unit Four, Test 2, they study the details in the picture, and note that they were

'good at drawing'.

The dimensions of religious education involved the discussion of the symbolism of light and dark in cave-painting and in other cultures, the needs and fears of Iron Age people, the teaching of early Celtic and Roman missionaries. It may be that this helped children to consider the reasons for beliefs and rituals, in other societies. The mathematics component may have encouraged deductions involving estimates (in Unit Four, Test 3, two children estimated that "It might take 1,000 people to fill the church. The population must have been big."). They consider shape (in Unit One, Test 3, one child says of the stone circle "They had another shapes in maths." In Unit Two, Test 2, "The horse has a special 3D effect," in Test 4, the Iron Age fields are "Square or rectangular.").

An integrated project with a clear history focus seems the most economical way, in a crowded curriculum, to allow children to become steeped in a period; it also demonstrates how history involves the history of thought in all discipline and aspects of society (Phenix (1964), Collingwood (1946)), and, in turn, it can give a purpose to experiment in science and to calculations in mathematics.

A7. ACCELERATION

This study suggests that if children are taught consistently, applying the same teaching strategies to new material, they learn patterns of thinking which can be transferred, and that the quality of their thinking improves. By Unit 4, the experimental groups in their written evidence tests reached higher levels of deductive argument than they had in the previous units, and higher than those reached by the control group (graph Fig 4 (i)) In their group discussions,

they were able to introduce a greater number of supposals (table (i), and were able to transfer abstract concepts learned in Unit One to interpret evidence in Unit Four (bar chart 3.3). Experimental group 1, who were originally poorly motivated in Unit One, got used to the thinking patterns expected, and by Unit Four, performed at a similar level to experimental group 2. The control group, who started at a similar level to experimental group 1, did not achieve deductive reasoning scores comparable with those of the experimental groups, at the end of the four units (Fig 4 (i)).

However, there was also a consistency in the questions, format and sequence of the evidence tests. This consistency in the tests alone seems to have influenced the thinking of the control group in spite of a different teaching style, because they, too, improved (although to a lesser extent than the experimental groups) in their evidence test scores over the four units (Fig 4 (i)). This suggests that it is important for children to learn patterns of thinking, and for teachers to be clear what these should be.

B. IMPLICATIONS OF THE FINDINGS FOR FURTHER RESEARCH

This study raises a number of questions for further investigations. Firstly, it would be interesting to know whether historical evidence can be categorized according to 'levels of difficulty' and, if so, what constitutes these levels. The problems of using evidence of differing complexity was referred to in Chapter One. The problem is compounded because the complexities of interpretation and of evidence interact; there can be complex interpretation of apparently simple evidence, or vice versa. It should be possible to find similar but different evidence, and test children of the same age on the same periods, using the same teaching strategies and achieve similar results.

However, the problem of 'familiarity' of evidence would remain. (Donaldson (1978) showed that children may reason more competently about material which is familiar).

It would be interesting to see if similar evidence could be found for other, more recent, periods, about which there is more known information, and differences between past and present may be more subtle, and to see if children in the 8-9 age-range could make similar numbers of valid supposals, or whether perhaps they might make more supposals, but fewer of them could be considered valid because more is known of later periods. (Their suppositions could more easily be refuted by historians with access to more information).

Further work could investigate whether, in a cross-sectional study over a wide age-range, development could be traced by using the same three questions (what do you know? what can you guess? what would you like to know?), but using a sequence of increasingly complex evidence. Perhaps the sequence would be, initially, one piece of evidence, as in this study; several pieces of conformatory evidence of different types; non-conformatory evidence; evidence showing bias or prejudice; evidence representing a range of points of view. Alternately, the same evidence could be used in a cross-sectional study, but an increasingly complex sequence of questions could be devised.

Longitudinal studies could provide a greater understanding of patterns of development in relation to a range of different teaching strategies, isolating particular variables, although this raises moral questions.

It would also be interesting to trace development before eight to nine years. This study was intended to investigate the earliest stages of historical thinking but the competencies it revealed, and the

introduction of a national curriculum for history for infants raise the question of how genuine historical problem-solving may be achieved with very young children, and the strategies, perio s, evidence and questions which are most suitable.

There is also a need for longitudinal and cross-sectional studies to investigate taught historical concepts, continuing the work of Furth (1980), since these were the research archer fundamental in children's interpretation of evidence.

C. CONCLUSION

For the first time, a National Curriculum makes it a statutory requirement that history is taught in primary schools, and the attainment targets attempt to ensure that children learn about the past through an active involvement in the problems of understanding time and change, and of interpreting different kinds of evidence, at all levels. This study suggests some ways in which work may be planned which makes this possible for young children. The establishment of such an approach to history in the primary curriculum constitutes an advance in the education of young children, because it synthesizes two previously antithetical assumptions about early learning. It has been believed, since the work of Piaget, Vygotsky and Bruner, that effective learning takes place through interaction with the physical environment and with other people's responses to it. Therefore, learning is promoted throu h active problem-solving and collaborative group work. However, for this very reason, there has also been an emphasis, at the primary stage of 'concrete operations', on offering to young children an education based on direct physical and sensual experiences, and it has been assumed they cannot go beyond these to discuss the abstract. Consequently, they are not thought to be capable of genuine historical problem-solving. The researcher's experience as a class teacher has

strongly suggested that this is not so, that children particularly enjoy history-focused topics, and both they and non-specialist teachers derive great pleasure from grappling with real, if simple, historical problems, from internalising the material, making it their own, and so feeling that they are acquiring control over their own thinking, as Donaldson (1978) urges that they should. This study analyses, records and endorses and researcher's general experience in a more precise way.

It also indicates how history may be taught as the focus of an integrated curriculum. This is important because the National Curriculum has so far been devised by separate subject committees, all of which, nevertheless, state that 'cross-curricular links' are essential. There are considerable areas of overlap, between geography, technology and science and history. Mathematics and language, through a core part of the curriculum, are recognised as communications systems which must be learned through communicating information of relevance and interest. The curriculum is at present felt by teachers to be over-crowded because so far there are no cross-curricular plans showing how topics, previously criticised for their rag-bag approach, can be organised in such a way that they deliver the National Curriculum, and give due recognition to the programme of thinking skills which lie at the he rt of each discipline (Pring (1976), Lawton (1975), Bruner (1963, 1966)). This study suggests that it is possible toestablish history at the heart of the primary curriculum for at least part of the year. On the other hand, it could indicate that in some circumstances, more progress would be possible in developing historical understanding if history is taught as a separate subject.

This thesis also indicates some of the ways in which teachers can plan work which focuses on different aspects of historical problem-solving

as an on-going part of the process of learning history. As Alan Blyth (1990) suggests, it is teachers' ability to do this, rather than summative end-of-unit tests, which will raise the standards of history teaching in the primary school.

Finally, although the study in some ways illuminates some of the ways in which the National Curriculum may be put into practice, it also raises questions about how teachers may investigate, evaluate and, ultimately, modify the National Curriculum, in the way that both the National Working Group Final Report (1990) and the Secretary of State (in his speech to AMMA[1]) advocate. This thesis suggests, for example, that Attainment Targets 2 (Interpretations) and 3 (Evidence) posited in the Final Report of the History Working Group, cannot be taught and evaluated as discrete skills. It implies rather that understanding the views of different groups at the time of an event, and understanding why the interpretations of historians may differ are both understandings which develop, from the very beginning, through discussing evidence.

If the National Curriculum is to succeed in establishing history as an essential aspect of a broad primary curriculum, it will be through the conviction, enthusiasm and efforts of class teachers. It is hoped that this study will show them that they are able, through thoughtful daily practice, to evaluate and modify what and how they teach. They are the experts, and the practitioners. They must provide evidence for the ways in which, and the extent to which, the National Curriculum for history can work. It is important that they have the confidence to recognise and assume this challenge.

[1]Proceedings of Assistant Masters and Mistresses Association 1990. p 11. Address by Rt. Hon John McGregor. "It is a living model...(which) will undoubtedly evolve as the demands of education evolve...I strongly recognise the importance of teachers themselves being involved in the whole process.."

APPENDICES

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Appendix I

The Stone Ages, Unit One. Plan of Integrated Curriculum

Languag

(1) 3 levels of concepts taught as spellings and us d in discussion of evidence.

(2) Discussion - contributing and supporting ideas - note-taking.

(3) Reference skills, using books and database.

(4) tory-writing 'My Stone Age tory'.

(5) Class novels 'The Dream Time' (H. Treece) and 'Stig of the Dump'.

(6) Drama - 'A Hunt in the New St ne Age'.

Sciences

(i) Experiments with levers and pulleys (Grimes Graves; Stone Circle).

(ii) Classifying soil types and properties, and plants and animals they support.

(iii) Cooking: grinding wheat between stones, making dough, and cooking on griddle.

rt

(1) Book-making

(2) Drawing plants collected on Farthing Down in various media.

(3) Painting projected slides of cave-paintin s using oxides.

(4) Pottery - copying Stone Age pots imprinted with natural objects.

History

(1) Deductions from selected evidence, making istinction between knowing, g essing and not k owing.

(2 Discussi n of changes b twe n old iddle and New tone Age; climate, physiolog cal evelopment, effects of memory, reasoning, planning, c ance and experiment. (See Lesson Notes Appendix IX).

R.F.

(1) Signs d ymbols in cav -painting and petroglyphics as symbols of communication→ o her ways of communicating deas and fe lings.

(2 Light and dark, as symbols of feelin s and values; power in cave-aintings and tone Circles in other cultures.

Maths

esign and make a Stone A e projectile.

xperiments and graphs to investigate effects of height, sp ed and distance.

g phy

(1) Visit to Farth ng Down to find out how we could survive in Neolith c times. Relate area to OS relief map. Study chalk, flint, and clay and discuss u s for weapons and pots. Study vegetation and u e for shelter, medi ine and food. Draw own ma s of area in school, using own symbols fo grass, marsh and woods, and disc ss uses of each.

(2) Visit Grimes Graves. Demonstration of making flint axe, and bow drill. Model showing flint strata.

Appendix II

The Bronze/Iron Age, Unit Two. Plan of Integrated Curriculum

Language

(1) 3 levels of concepts taught as spellings and used in discus ion of evidence.
(2) Discussion - contributing and supporting ideas, note-t king.
(3) eference skills using bo ks and database.
(4) Story-writing. 'My Iron Age Story'.
(5) Class novel 'The Changeling' (R. Sutcliffe).
(6) Drama - A walk across Riddlesdown in Roman Times.

Sciences

(1) Wool: carding, spinning, weaving experiments
(2) Experiments with four natural dyes (blackberry, cochineal, onion, privet) and three mordants (tin, copper, iron). Results tabulated.
(3) Cooking - an Iron Age meal: mutton, pulses and root vegetable .

Art

(1) Book-making
(2) Drawing based on sketches in British Museum
(3) Screen printing fabric with Celtic designs
(4) Pottery models of: pipe furnace, bowl furnace, charcoal clamp.

H story

Deductions from selected evidence, making distinction between knowing, guessing and not knowing. (See Lesson Notes, Appendix X).

R.E.

'Daily Bread' What is the significance of this? Subsistance farming in Iron Age. What are essential needs? Did Iron Age people pray? What for? ubsistance farming today. Distribution maps of water, food, energy, pollution.

Maths

stimate length and width of field, estimate area, how long it would take to plough, size of crop, and community it would support.

Geogr phy

Visit Iron Age fields on Farthing Down marked by lynchets and trackway. Discuss (a) formation of lynchets, erosion by wind and rain , and how grass anchors on barks to form lynchets; (b) best po ition of field on slope.

Appendix III

The Romans. Unit Three.
Plan of Integrated Curriculum

Language

(i) 3 levels of concepts taught as spellings
(ii) Discussion - contributing and supporting ideas, n te-taking
(iii) Reference skills using books and database
(iv) Class n vel: The Bronze Sword
(v) Poetry writing, Th Roman Inv ion: Boudicca's Revolt.

ciences

Cooking - Roman menus: yeast, wines - fermentation
spices- pre rvation.

Art

(1) Pen and ink drawings of artefacts

(2) Models: pottery head of Mithras, Roman villa, Fishbourne.

History

Deductions from selected evidence.

(See Lesson Notes Appendix XI).

R.E.

Roman beliefs
(1) Evidence of ruid beliefs (Tacitus Annals XIV).
(2) Roman Gods (a) Emperor worship; (b) myths/legends; (c) household gods; (d) tombstone inscript'ons; (e) soothsayers.
(3) Christianity: (a) Mildenhall treasure; b) Lullingstone Christi n wall-paintings; (c) Diodetian's edict of tolerance 312 A. .

Maths

Geogr phy

(1) Visit to Riddlesdown to study pro erties of clay soil, and site of (probable) Roman road from coast to London.
( ) Visit to Farthing Down where omano-British shards found: what was relationship between the Romans and British settlement there?
(3) Visit Coulsdon Woods to identify site of Romano-ritish camp and cemetary on hill top.

Appendix IV

The Saxons. Unit Four
Plan f Inte rat d Curr'culum

L nguage

(i) 3 levels of concepts taug t as spellings and used in di cussion of evidence
(ii) Disc ssion, contributing and suggesting ideas - n e-t king
(iii) R f rence kills using books and dat base.
(ıv) S ory wr'tın 'Sutt n Hoo tory'
(v) Cla s novel - wn Vind, . u cliff

A t

(1) Book-makıng
(2) Drawıng and paintin s of Sutt n Hoo trea ures
(3) Drawings of plants found in h dge-dating
(4) Sewing based on th se
(5) Model - a Saxon ch rch
(6) 'Ang o-Saxon' pottery

H'story

(1) Dıs us i of evidence b d on knowin , gues ing and n t knowing:
(a) origins of An les axons rısians Jutes
(b) Areas of settlement
(c) A glo- ax n laws and customs
(d S read of Chr'stianity

(S e Lesson Notes A p n ıx XII)

.E.

(1) The Celtic Church: t. Patrıck, . Columba, St. Aidan
(2 he oman Church: p Greg ry, Aethelbert of K t, Paulinus of Northumbrıa.
(3) The fusion of the two churches; e churches, stone cross , poetry, Caedmons Dream of the ood); history - Bed

M t s

Time distance scal and ratio related to maps.

(Not ın fact taught).

G og phy

(1) Visıt to Co lsdon. Discuss suitabilit of site for S x n settlem t: good w ter up ly, flat clay, soil good f r crops. H d e-dat ng (means at lea t 700 years old). Couls on me ns 'a settlem nt in a v lley'. Charter d ted 675 A.D.
(2) Maps: Saxon and An les ori n , areas settled, 7 k ngdom , establishm nt f Chri t- nity.

APPENDIX V

Key concepts selected and taught in Unit One, The Stone Ages. (These are underlined in lesson plans, appendix IX).

The relative nature of the levels of concepts is discussed in Chapter One.

Concrete	Abstract	Superordinate
axe	tools	control
scraper	invent	attack
bow	weapons	protect
arrow	co-operate	defend
antlers	climate	power
pine	hunt	archaeologist
oak	food	neolithic
chalk	shelter	mesolithic
clay	pottery	palaeolithic
flint	medicine	nomadic
slope	symbol	geology
hachure	sign	vegetation
stream	language	trade
marsh	crops	community
wood		agriculture
painting		domesticate
circle		trade
cave		ceremony
ditch		ritual
entrance		communicate
grave		belief
oxide		

APPENDIX VI

Key Concepts Selected and Taught in Unit Two, the Bronze/Iron Ages. (These are underlined in Lesson Plans, Appendix X).

Concrete	Abstract	Superordinate
island	tribe	ceremony*
chariot	trade	religious
thatch	merchant	civilised
seed	materials	community*
smelt	farming	society
money	crops*	transport
bronze	vegetables	specialise
straw	store	power*
coppice	grain	owner
build	harvest	agriculture*
waffle-and-daub	offering	domesticate*
plough	festival	trade*
oxen		
corn		

*Also taught in Unit One

Key concepts selected and taught in Unit Three. The Romans.

(These are underlined in Lesson Plans, Appendix XI).

Concrete	Abstract	Superordinate
legion	cavalry	*trade
battle	ambu h	celebration
fort	chief	surrender
villa	hostage	defeat
veranda	*tribe	*community
bath house	taxes	humiliated
courtyard	treaty	leisure
mosaic	view	*belief
granary	veteran	*power
slave	leisure	Empire
tomb-stone	myth	Emperor
sooth-sayer		*religious

*Also taught in Units One and Two

APPENDIX VIII

Key concepts selected and taught in Unit Four, The Saxons. (The e are underlined in lesson plans)

Concrete	Abstract	Superordinate
monster	warrior	settlement
feast	friendship	attack
boast	folk-tale	defend
leader	strength	protect
fight	courage	vengeance
elderman	peace	hero
charter	war	culture
oath	reward	
king	fear	
council	successor	
missionary	duties	
monks	ceremony	
	laws	
	Christianity	
	poetry	
	ornament	
	church	
	decoration	
	manuscri t	

APPENDIX IX

Lesson Plans for UNIT ONE The Stone Ages

Lesson One - The Old Stone Age (Palaeolithic)

EVIDENCE	DEDUCTIONS
1. BONES radio carbon dating (i) The Heidelberg Jaw. 400,000BC in 'Stone Age Man' Dickinson, A. p 19. Watts 1963. (ii) Neandertal Man. 100,000BC Complete skeletons. in 'Stone Age Man' p 22. (iii) Homo Sapiens in 'Stone Age Man' p 27.	We know Creatures similar to us developed in different parts of the world. There are hundreds of thousands of years between when these three creatures lived. We can guess what they looked like: (barrel chest; stocky; large brain). We do not know how the different stages and groups were related. What they thought. How they communicated.
2. STONES Hand axes chopping tools flake saw scraper chisel polished (bone) needles awls to make holes 'Man Before Metals' British Museum Publications 1979 p 10.	We know They became increasingly skillful and in control of their environment, using tools and weapons. They had tools for different purposes. The weapons gave them power to attack and defend We can guess they could dig up roots; chop up dead animals; scrape the skins make clothes. They could remember; pass on skills; work together; kill animals; invent; co-operate. We do not know the size of their groups/families. How far they travelled. How long they stayed in one place.
N.B. Vocabulary underlined in lesson notes taught as key concepts. For list see Appendix V	

Lesson Plans for UNIT ONE The Stone Ages

Lesson Two - The Middle Stone Age (10,000 - 4,000 BC Mesolithic

EVIDENCE	DEDUCTIONS
1. POLLEN Pollen from pine trees, oak, beech, elm.	We know the climate was temperate. We can guess animals were smaller (pigs, deer, bears, beavers, hares). people hunted smaller animals; they needed finer weapons.
2. STONES (i) arrow heads	We know bows and arrows are more silent and powerful than spears. They shoot further; they can be retrieved. We can guess they had fine muscle control, to make and fire it; good judgement of speed and distance; they could control the herds while hunting - protecting females and young.
3. BONES (i) antler caps (B.M. slide)	We know there were deer. We can guess they were used for stalking animals for food (they followed the herds nomadic); they wer used in a hunting ceremony they believed in 'magic' - supernatural powers.
(ii) bone harpoons (B.M. postcard) BM/C/PR/020	We can guess they hunted fish - size of fish - they ate fish for food

Lesson Plans for UNIT ONE The Stone Ages

Lesson Three - The New Stone Age (4,000 - 1,500 BC)(Neolithic

EVIDENCE	DEDUCTIONS
1. STONES (i) stone hoe, sickle, grinding mill. 'Man Before Metals' p 18 BM Neolithic Flint Sickles slide Museum of London OL 93	We know they grew crops they lived in one place. We can guess how they learned to grow seeds (observe, experiment, select); they grew corn; they ground the seeds; they lived in houses; they lived in a community they could plan, organise, make rules they lived in 'permanent' houses.
(ii) axes (Man Before Metals p 18) Visit to see axe made, using reindeer antler, at Grimes Graves.	We know the axes were used to clear forest. We can guess more tools were needed they were made in special 'factories' they were traded in areas where there we no flint. We do not know what they were traded for; how trade was organised.
2. BONES sheep, goats, cattle, pigs.	We know they learned to domesticate animals they ate meat. We can guess they bred animals selectively. They made things from leather. They cooked meat.
3. POTTERY Mortlake bowl 2,000 BC. BM postcard BM/C/PR/027 Handled beaker 1,600 BC. BM postcard BM/C/PR/030	We know they could fire clay to make pottery. We can guess they used pots to cook and store food.

Lesson Plans for UNIT ONE The Stone Ages

Lesson Four - Paintings, Signs and Circles

EVIDENCE	DEDUCTIONS
1. PAINTINGS Lascaux cave paintings. Slides and postcards.	We know they painted using oxides; the types of animals the climate and vegetation temperate (only one rhino; no mammals); able to remember and draw characteristics of animals. We can guess how they painted (finger feather or hair brushes or blown through hollow reed or bone, for dappling). Done over many generations, by many people sharing same ideas. Difficult access and dark its purpose was utilitarian, not decorative. Probably used in hunting ritual; probably believed drawing an animal gave them control over it.
2. SIGNS Dots and dashes painted on pebbles BM postcard BM/C/PR/019	We know they had symbols for passing on 'messages' - communicating. We can guess they could talk and had language before they could 'write'; what sort of 'messages' would they want to pass on, and why?
3. CIRCLES Photographs and plans in 'Stone Circles of the British Isles' Burl, A Slides - Stonehenge and Avebury. Department of the Environment. Castlerigg, Cumbria (postcard).	We know they vary in size (axes, bones, pots) and on graves, number of stones; some have 'finds'; some have ditches around them; some have gaps which look like 'entrances'. We can guess what they were used for (meeting places; trade; ceremonies connected with time and seasons). How they were built; who built them. They had beliefs about the meaning of life.

Lesson Plans for UNIT ONE The Stone Ages

Lesson Five - 'Local Visit' to Farthing Down

'How Could People Survive Here in Neolithic Times?'

EVIDENCE	DEDUCTIONS
1. Relief map studied on site. Hachures show slopes. 2. Geology the top of the Down has thin, sandy soil, and chalk with flints underneath; this is porous. The slopes are clay and this is sticky. In the valley bottom, there is marsh and a stream.	We know flint implements found on high ground, marked by hachures. We can guess they could farm on the thin soil with a simple plough (they understood agriculture); and make a shelter on the well-drained slope, away from the South West winds. There is flint for tools and weapons.
3. Vegetation: grass land on top, on chalk; yew and oak woods and scrub on clay slopes; willow and alder in marshy bottom.	We can guess cattle could graze on top. They used yew for bows; dogwood for daggers. The collected food and medicines berries - crab apples, haws, sloes. roots - wild carrot and parsnip. leaves; nettle, herbs.
4. Animals supported by vegetation	We can guess that in the grass they caught deer, fox. In the woods - birds, boars, wolves, bears. In the marshy bottom - fish, duck, geese.

APPENDIX X

Lesson Plans for UNIT TWO The Iron/Bronze Age

Lesson One (a) - Written Evidence

EVIDENCE	DEDUCTIONS
1. APPIAN (14.4.5) c. 330 BC. Writes about Pytheus, a Greek sailor, who sailed to a trading post at St. Michael's Mount, then right around Britain, "The Tribes were independent, ruled by kings, and preserved their ancient customs. They used chariots in war, and their houses are made of log and thatch. They stored dry grain in covered pits, and seed corn in small square huts to protect it from mice. They brewed drink from corn and honey."	We do not know if this second hand account of a sailor noted for tall stories is accurate, or how much of Britain he saw. We know there were tribes ruled by kings, with ancient customs it was organised society with rules. They lived in houses made of logs and thatch; they lived in settlements - had building skills and tools. They used chariots in war they had transpo and wars. They stored corn and seeds; they were agricultural.
2. DIODORUS SICCULUS (v.22.2) c 330 BC Also writes about Pytheus' journey "The inhabitants of Britain who live in Cornwall are especially friendly to strangers, and from meeting foreign traders, have adopted civilised habits. It is these people who produce tin, cleverly working the land which bears it. They dig out the ore, melt it and purify it. Then they hammer the metal into ingots like knuckle bones, and transport them to an island off the coast called Iotis, for the channel dries out at low tide and they can take the tin over in large quantities in their carts.	We can guess some people were richer and more powerful than others. The tribes fought each other. They had weapons. We do not know how true or general thi account is either. It is told by the same sailor. We know Gauls traded with Britons living in 'Cornwall'. The Britons were aware of other cultures, since a Greek sailor went there. The Britons mined and smelted tin. Their trade wa organised. We can guess people had specialised

/cont....

/cont....Lesson Plans for UNIT TWO The Iron/Bronze Age

Lesson One (a) - Written Evidence

EVIDENCE	DEDUCTIONS
2 (cont....) Merchants purchase the tin from the natives there, and take it back to Gaul.	skills. There were merchants. They had some kind of money. They bought things in return for the tin - such as.....?
3. JULIUS CAESAR (de Bello Gallico iv 20.21 - v 12-14). c. 50 BC "They have many houses, and large herds. They use bronze and gold coins, or, as an alternative, iron rods of fixed weight. Tin is found inland, and small quantities of iron near the coasts...." "Britons dye their skin with woad, which produces blue colour, and they look more terrifying in battle. They do not cut their hair, but shave all the rest of their body except the head and upper lip. Wives are shared between groups of 10 - 12 men, usually made up of brothers or fathers and sons. The children are reckoned as belonging to the first man each girl marries."	We do not know how general Caesar's picture is, or if he was biased, and tried to make Britons appear more fierce, or savage, because he wanted to defeat them, and was not entirely successful. We know they kept cattle; they had domesticated animals. They used metal coins and iron bars as money. They had battles. They lived in communities. The Romans travelled to Britain. We can guess they lived in extended family groups. They used money to trade; they were in contact with distant places. We can guess why the Romans came to Britain.....?

Lesson Plans for UNIT TWO The Iron/Bronze Age

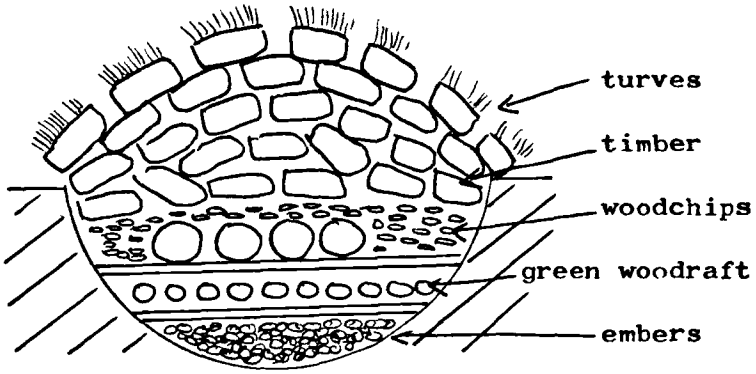
Lesson One (b) - Iron Age Technology

1. A Pottery Clamp

At 750° clay changes its structure. After this it is impossible to destroy it completely.

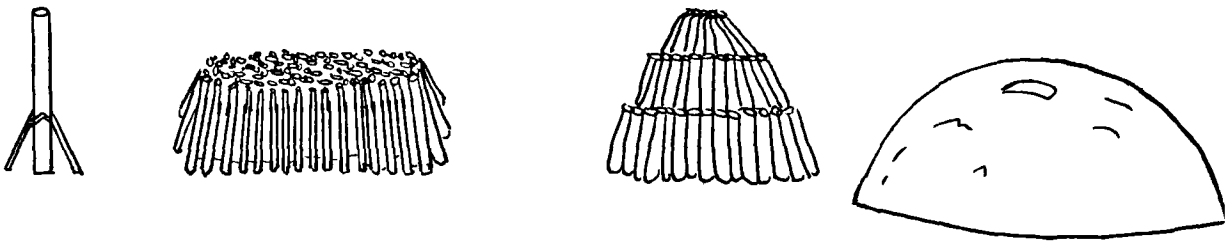
It takes 24 hours for the clamp to burn through. It may reach 900°C.

The pottery is black because no oxygen is present.



2. CHARCOAL BURNING

1 2 3 4

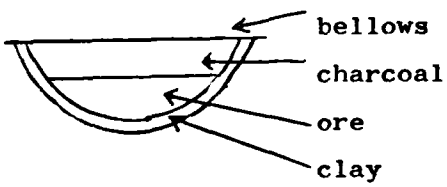


Charcoal burns hotter and more slowly than wood. It is essential in smelting bronze and iron. It was probably discovered in making pottery.

Timber is cut and stacked closely together, leaving a hole in the centre. The outside is covered with turves. Burning embers are put into the hole, which is then sealed. The fire burns up all the oxygen, then burns the natural gasses in the wood itself. It burns for several days.

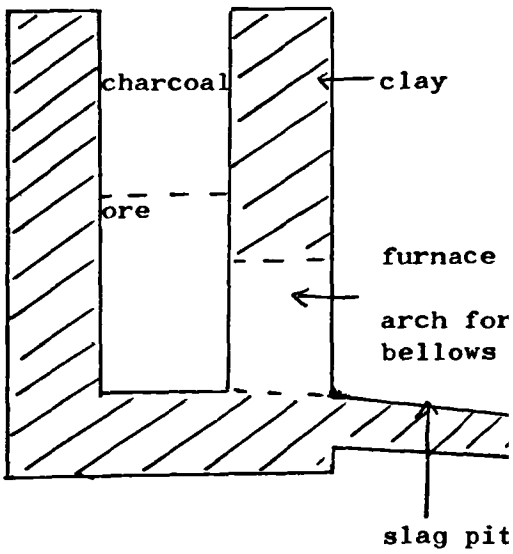
3. SMELTING METAL

1. Bowl Furnace



Charcoal and ore are loaded into the furnace and heated for about four fours to 1300°C. The crude iron from the bottom is then heated and hammered to form a block of wrought iron. This is reheated to make tools etc.

2. Pipe Furnace - 1 metre tall



Lesson Plans for UNIT TWO The Iron/Bronze Age

Lesson Two - Houses

EVIDENCE	DEDUCTIONS
Plans of Iron Age Houses showing post-holes, in 'Iron Age in Lowland Britain', Harding, W. 1974.	We know size (diameter); shape.
Reconstruction of an Iron Age house at Pimperne, Devon, in 'Iron Age Farm. The Butser Experiment. Reynolds, P.J. The British Museum, 1979.	We can guess materials used. Walls between posts filled in with wattle and daub, or stone, or turf, or clay/chalk. hazel and willow coppiced for wattle.
	We know they had to select, fell and transport logs.
Post holes	We know they had iron tools.
Used timber	We can guess special woodwork skills were needed. They understood stresses and strains of structure.
Iron Age axe and saw found in Glastonbury	We can guess roof made of thatch straw had to be stored. Thatch tied on with strips of animal skin. had to scrape, soak and cut skins.
	We can guess the purpose: ownership or to keep cattle out (or in). Defenc against people or wild animals?
Ditch around some plans of Iron Age houses.	We do not know what buildings were used for - specialised purposes, family units?
	If cattle were separate from people. How ownership transferred.

Lesson Plans for UNIT TWO The Iron/Bronze Age

Lesson Three - Farming

EVIDENCE	DEDUCTIONS
A. Animals	
(i) Horses (Horse brasses seen in British Museum)	We know they used horses horses trained, domesticated.
(ii) Chickens and geese	
(iii) Dogs - exported hunting dogs in 'Iron Age Farm' The Butser Experiment Reynolds, P.J.	We know they traded. We can guess Britons used dogs to hunt and for other purposes.
(iv) Cattle (bones found of)	We know they had meat, leather. We can guess they had milk, butter, cheese. They probably lived in farm compounds in order to collect dung.
(v) Sheep	We know they had meat and wool. We can guess Soay sheep, since found in Scotland, which are hardy and small Wool probably pucked.
(vi) Goats	We know they had milk, hair, leather. We do not know how animals fed in winter....dried hay or vetch?
B. Crops	
(i) Seeds: Carbonized. Seed impressions in fired pots. Stomachs of people (Reynolds, P.J.) The Butser Experiment.	We know they had grain, emmer, spelt, barley, vetch, field beans. We can guess they made flour, bread, beer and ate vegetables. We do not know yields expected. How they harvested or threshed to loosen seeds. What happened to surplus - stored? exported? Did they celebrate harvest with religious festivals or ceremonies of thanksgiving offerings?

/cont....Lesson Plans for UNIT TWO The Iron/Bronze Age

Lesson Three - Farming

EVIDENCE	DEDUCTIONS
/cont....	
(ii) Plough: ards found preserved in peat bogs. Cross plough markings in soil. Rock carvings in Spain show cattle pulling wooden plough. Pulled by oxen - hones found.	We know they used wooden plough, and oxen, to cross-plough. We can guess crops were rotated (since beans replace nitrogen used up by wheat and barley). We do not know how they levelled the ground after ploughing. How seeds were planted (broadcast? dibber?).

Lesson Plans for UNIT TWO The Iron/Bronze Age

Lesson Four - Art, Artefacts and Beliefs

EVIDENCE	DEDUCTIONS
1. British Museum: Horse brasses and coins with horses on. Model chariot.	We know they bred horses, trained them and used them for drought. They had brass, tin and copper. Used money. We can guess they rode horses. That the horse was important to them. Used money to trade - to trade what?
2. Butser Ancient Village:	
Spindle	We know they spun wool.
Loom weights	We know they wove cloth. We can guess they dyed cloth and wore cloth.
Oven	We know they baked. We can guess they cooked - what?
Quern stone	We know they made flour, breads. We do not know if everyone shared these skills, or were they specialised?

Lesson Plans for UNIT TWO The Iron/Bronze Age

Lesson Five - Visit to Iron Age Fields on Farthing Down

EVIDENCE	DEDUCTIONS
Geology Thin, sandy soil and chalk with flints	We know it would be easy to plough Drainage would be good.
Vegetation Sparse trees, and scrub	The few trees could be felled and the scrub burned in order to plough.
Lynchets On slope just below the top of the down	These were made as the plough turned and grew bigger because soil drained down the slope, grass compacted them and loose top soil either side blew away. Iron Age people farmed here. We know the shape of their fields (square or rectangular), the size, and area.
Trackway between lynchets	This made it possible to take plough and crops from fields on either side. We can guess what crops they grew (from Butser evidence) and what animals they kept, and what their houses were like. We do not know how big the settlement was; if the number of fields suggests a large settlement, or if they ploughed up new fields as the old ones became exhausted. Where the houses were. If they sold any of the crops. How the community was organised.

APPENDIX XI

Lesson Plans for UNIT THREE, The Romans

Lesson One. Julius Caesar's Journeys to Britain

EVIDENCE

1. 55 B.C.

(a) De Bello Gallico IV. 23 (extract given below)

Cavalry were driven off course and Caesar's boats destroyed. While boats repaired, Caesar's men collect corn and are ambushed.

Caesar sent 30 more horses, won the battle and took hostages to a celebration in Rome.

(b) Map showing Caesar's route 55 B.C. and route of cavalry ships.

2. 54 B.C.

(a) De Bello Gallico 2 8ff 19ff (extract given below)

2,000 cavalry, 600 ships, 5 legions (25,000 men).

Kentish chiefs allied with Casivellaunus .˙. Caesar marched to Casivellaunus' capital at Wheathampstead. Casivellaunus followed Romans with 4,000 chariots under cover of woods.

6 tribes surrendered to Caesar.

.˙. Caesar defeated Casivellaunus, took hostages and taxes, and returned to Rome.

(b) Map showing Caesar's route 54 B.C. to Wheathampstead.

DEDUCTIONS

WE KNOW

Caesar wanted power in Britain.

The Romans had a large organised army of cavalry and foot soldiers.

Caesar travelled between Rome and Britain.

The Britons grew corn, lived in tribes with chiefs, in communities, had money (taxes). They had a large fighting force, and travelled in chariots. Some were prepared to support Caesar .˙. the tribes were not united.

WE CAN GUESS

Caesar wanted control in Britain.

He wanted British corn/British taxes.

Control in Britain would give him power/importance/support in Rome.

He was not as successful in Britain as he hoped.

WE DO NOT KNOW

Why 6 tribes surrendered:

were tribes rivals?

had they been bribed?

did they think contact with Rome would be useful?

Caesar de Bello Gallico IV August 26th, 55 B.C.

At this moment the standard-bearer of the Tenth Legion, after calling on the go s to bless the legion, shouted, "Come on, men! Jump, unless you want to betray your standard to the enemy! I, at any rate, shall do my duty to my country and my commander." He threw himself into the sea and start d forward with the eagle. The rest were not going to disgrace themselves; cheering wildly, they leapt down, and when the men in the next ships saw them, they too quickly followed their example....The Britons, of course, knew all the shallows; standing on dry land, they watched t e men disembark in small parties, galloped down, attacked them as they struggled through the surf, and surrounded them....When everyone was ashore and formed up, the legions charged....

Caesar de Bello Gallico V July 20th - September 25th 54 B.C.

On learning of the enemy's plan, we moved up in full strength to the Thames. The river can be forded at only one point, and even there, the crossing was difficult. Large native forces appeared in battle order on t e far bank, which was also defended by a line of pointed stakes....The cavalry were sent over first, then infantry were ordered to follow soon afterwards; but the legionaries dashed through with such speed (though only their heads were above the w ter) that they were over as soon as the mounted troops. The Britons, overpowered by this combined attack, fled from the bank.

Lesson Plans f r UNIT THREE, The Romans

Lesson Two. Roman Conquest of Britain, 43-47 A.D.
B udicca's Revolt, 60 A.D.

EVIDENCE

1. 43 A.D.

(a) Dio Cassio 60. 19-22

Plautius had support of King Cogidumnus of the Atrebates. He captured Cunobelinus' capital at Colchester.

Other tribes were defeated or surrendered.

By 47 A.D. Plautius had control of S. E. England by building forts as he moved north-west with three legions.

(b) Map showing routes of legions (IX XIV II) 43-47 A.D.

2. 60 A.D.

(a) Suetonius destroyed Druids' centre on Anglesey 60 A.D.

(Tacitus Annals XIV 29-34 given below).

(b) Rome demanded back all money lent to Prasatagus, chief of the Iceni when he died, and declared Iceni land captured. Boudicca, his widow, protested; she and her daughters were flogged and raped.

(Tacitus'description of Boudicca given below).

DEDUCTIONS

WE KNOW

Rome still wanted control of Britain; Roman Empire still powerful; Roman army strong and organised and ruthless. Romans establish control by building roads, towns, forts.

The British tribes were divided; some supported Romans, and some made deals with Romans. Others attached Romans.

We know what Boudicca looked like....

The Druids were powerful.

WE CAN GUESS

The Roman army was more experienced than it was nder Cae ar. Rome still wanted control of Britain because of its resources; it w s threatening the Roman Empire in Gaul.

The Iceni did not understand their treaty with Rome.

Women could be powerful in the British tribes.

Some Britons felt humiliated, angry.

WE DO N T KNOW

Wh t co tact Romans had had with Britons since Caesar's journeys.

Why not all tribes opposed Rome.

What contact there was between Romans

EVIDEN E

The Iceni and Trimovantes marched to Colchester and defeated IX legion, and burnt Colchester (Camulodunum .

Britons attacked and burnt London and St. Alba s (Verulanium).

The Romans defeated Boudicca and the Britons in a great battle near Watling Street. Tacitus says 80,000 Britons and 400 Romans (!) were killed. Romans establish network of roads and forts and control of Britain.

(c) Map showing Boudicca's Rebellion, 60 A.D.

EDUCTIONS

a d Britons after the roads, forts, towns were built.

What the Druids believed; what their rituals really were.

Why they were powerful.

How many Britons/Romans were killed in 60 A.D.

TACITUS ANNALS XIV 29-34

Suetonius' destruction of the Druids Centr on Anglesey 60 A.D.

"Then Suetonius shouted encouragement, and urging each other not to be scared of a pack of women and madmen, they advanc d, cut down everyone they met, and rolled them back into their own altar fires. Afterwards, a garrison was set over the conquered island. They cut down the groves devoted to their sacred rites, for the Druids thought it proper to dr nch the altars with the bl od of their captives, and to consult human entr ils to find out the will of their Gods. But while Suetonius was arranging this, news reached him of a sudden revolt."

Description of Boudicca

"She was a hu e woman, with a piercing gaze and strident voice. A mane of chestnut hair hung below h r waist. Round her neck was a great golden torque. She wore a full flowing tartan dress and over it a thick cloak, fastened by a brooch, she grasped a spear, to terrify everyone."

Lesson Plans for UNIT THRE , The Romans

Lesson Three. Roman Villas

EVIDENCE

Archaeological plans: post holes and stone foundations.
(Ditchley, Lockleys, Park Street, Lullingstone).

Tacitus (re Colchester: land often given to veterans of Roman army to support towns.

Aerial photographs of some Roman field patterns.

DEDUCTIONS

WE KNOW

They usually had a stone verandah, were rectangular, E shaped, or built around a courtyard; were often added to, over time, had special rooms, e.g. bath houses, had mosaic floors; had large rooms for storing grain (e.g. Ditchley - (granary); had gardens in the courtyard.

WE CAN GUESS

As Romans became richer they built on extra rooms.
Romans owned a lot of land.
How much land they owned from the size of the granary (e.g. Ditchley - 1,000 acres?).
The Britons did not like losing their land to the Romans.
The Romans enjoyed leisure; they liked sitting in the garden, looking at the view/sitting in the bath house/ dining room/looking at their mosaic floors.

WE DO NOT KNOW

Who worked the estates, and what conditions they worked in; were they Britons who were slaves?

EVIDENCE

DEDUCTIONS

Did they live in rooms in the house?

Did British houses continue alongside Roman villas?

How much land was taken from Britons and how much new land was farmed?

Was the extra corn for trade?

to feed the army?

Is this why the Romans wanted Britain?

Lesson Plans for UNIT THREE, The Romans

Lesson Four. Artefa ts, Ideas and Beliefs

EVIDENCE

1. Celtic beliefs

(Tacitus XIV 29-34) Destruction of their base in Anglesey 60 A.D.

2. Roman beliefs

(a) myths: Pan, Bacchus, Jupiter, Venus.

(b) religions from ther parts of the Empire: Mithras, an eastern god who 'slew the bull of darkness.' British gods of local springs and places.

(c) Emperor worship: temple to Emperor Claudius at Colchester.

(d) tombstone instriptions: (given below)

(e) 'votive bowls' Lullingstone

(f) soothsayers - ritual examinations of entrails of dead animals.

3. Christianity

(a) Chi/rho symbol n Mildenhall silver spoons but pagan gods on other pieces of silver.

(b) Lullingstone: w ll paintings of goddess of spring w ter, and Christian wall paintings.

(c) Diocletian's ed'ct of tolerance of Christianity 312 A.D.

DEDUCTIONS

WE KN W

The Romans destroyed the Druids beca se they were powerful. Their ceremonies took place in sacred groves, they had altars.

The Romans tried to explain life in terms of the influence/intervention of the gods.

They adopted beliefs of other parts of the world rather than think theirs were the only ones, and soldiers in the Roman army came from all parts of the world.

They used religious ideals to maintain political powers.

They offered gifts to their gods in the hope that they would look after them.

They wanted control over uncertainty, and hoped there is life after this one.

WE CA GUESS

No single religious belief was important to the Romans. Some Romans held pagan and Christian beliefs.

WE DO NOT KNOW

If the owners of the Mildenhall treasure believed secretly in Christianity, or if they held pagan and Christian beliefs; why t e treasure was buried. Were the spoons, bowls, cups, used in house or church services?

Tombstone Inscriptions

1) Housesteads - a doctor

"To the spirits of the departed and to Anicius Ingenuus, medical worker of the First Cohort of Tungrians: he lived 25 years."

2) Chester (B.M. Slide)

"To the spirits of the departed. Caecilius Antus of Emerita Augusta, soldier of the Twentieth Legion, of 15 year's service, lived 34 years. His heir has set this up."

Lesson Plans for UNIT THREE, The Romans

Lesson Five. Visit to local areas, with evidence of Roman occupation

EVIDENCE

1. Riddlesdown

(a) clay soil on top of Down.'. water-logged.

(b) river valley - bourne in Roman times.'.wet

(c) Roman road from South Downs to foot of Riddlesdown excavated, and continues beyond Riddlesdown to London.

2. Farthing Down

Roman shards found.

3. Coulsdon Woods

(Courdrey Gardens. Bourne Society 1970 IX)

British fortified settlement surrounded by 3 ditches and banks. Roman skeletons found in ditch.

DEDUCTI NS

WE KNOW

There is evidence of Roman occupation in this area

WE CAN CUESS

That the road passed along the side of the Down, where it is drained; that its purpose was to take wheat from the farming areas of the South Downs to London, and for transporting iron from the Weald. The Britons continued to live in this area and had some contact with the Romans.

WE DO NOT KNOW

How much contact there was or what the relationship was.

AP ENDIX XII

Lesson Pl ns for UNIT FOUR The Saxons

Lesson One - Where did the Saxons come from and where, when and how did they settle in Britain?

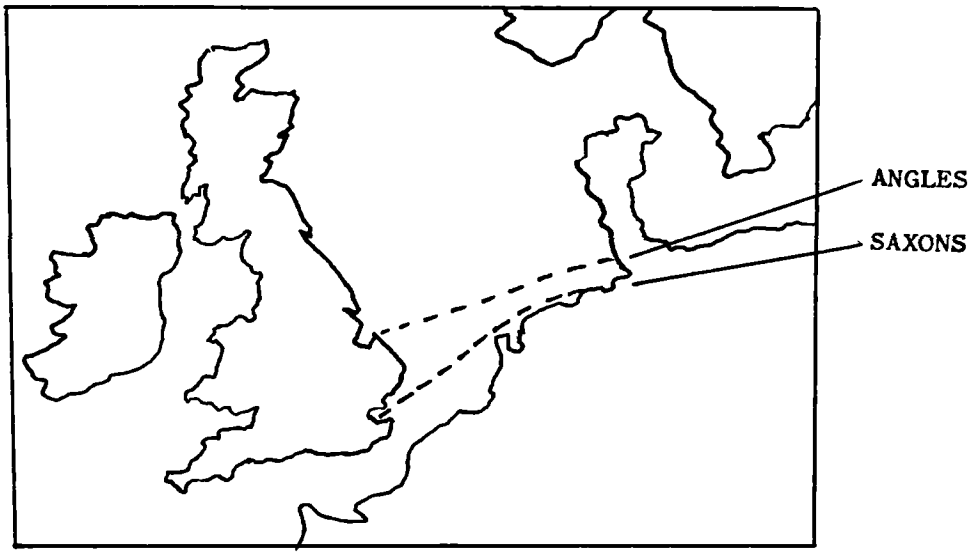
EVIDE CE	D DUCTIONS
1. Where did they come from? (i) Map showing supposed origin of Jut s Frisians, Angles and Saxons, c. 500 A.D. (ii) Cemeteries suggest Saxon lands were very densely populated.	We know Saxon artefacts (wrist clas s, brooches, gir le hangers) were found in Europe, and in this country; the Saxons came from Europe to Britain. We can guess Saxons came to Britain because they were too crowded at home.
2. Where did they settle? Map showing areas settled by South, Middle and East Saxons	We know (from place names and artefacts) where they settled. We can guess that they settled down the Th mes and its tributaries.
3. When did they come? Roman writers record: (i) 368 east coast defences were ext nded becau e the Saxons were attacking. (ii) 410 the Rom ns told the British tribal chiefs to defend themselves. (iii) 450 Roman towns were deserted and Romans could no longer govern Britain.	We know t ey could not defend the frontiers of Britain agains the Romans ttack, so the Roman government of Britain ended. We c n guess without Roman vernment and trade, people could not survive in the town . Therefore t e towns were deserted.

continued....

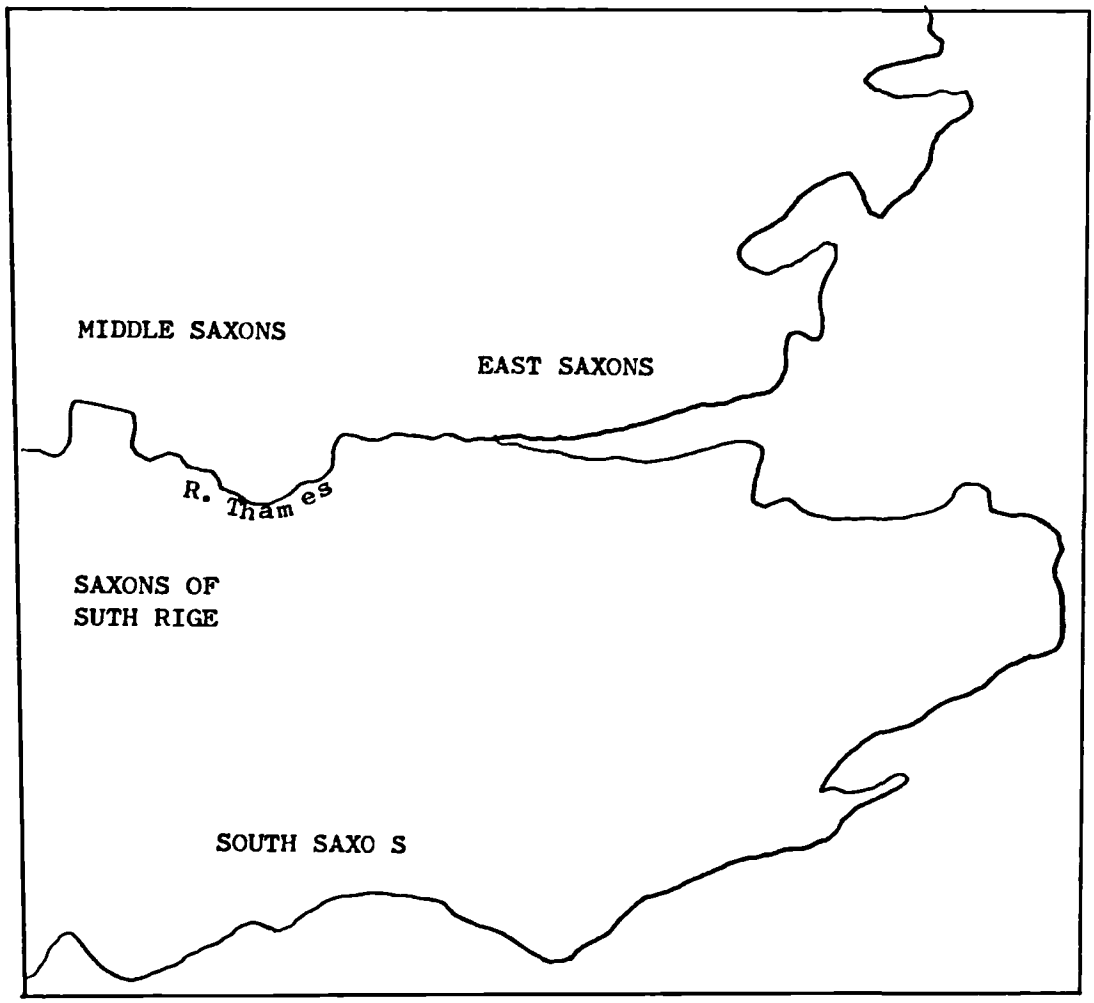
Lesson One continued....

EVIDENCE	EDUCTI NS
4. How did they settle?	We can guess that there were so e battle , but any Saxons came in small groups and made agreements with loc l chiefs to settle on unclaimed land.
(i) Gildas - a British chief called Vartigern called in Saxons as allies	
(ii) Gildas, Bede and Anglo Saxon Chronicle say Saxons defeated by 'Arthur' at Mons Badonicus at the end of the fifth century, and fifty years of peace followed.	

1. Map showing where the Saxons came from c. 500 A.D.



2. Map showing where the Saxons settled



Lesson Plans for UNIT FOUR The Saxons

Le son Two. The Saxons Settl in Brit in

EVID CE	DEDUCTIONS
1. Beowulf translated by Ian Serrallier, OUP 1975. a) killing the monster p12-13 b) killing Grendel's mother p25-26 c) killing the third monster p40-42	We know (i) that the earliest copy of the m n cript dates from 1000 B.C. The original was probably written in Mercia or Northumbria about 200 years earlier. (ii) Beowulf is the hero of the story. (iii) It is a folk-tale; it idealised truth. We can gu s (i) It is b sed on stories wh ch were told in northern Europe long before they were written d wn. (ii) There were, in those days, warrior band , roaming around ın search of adventure, enjoyin fea ti g and fighting (iii) The ba s had l aders. The w rrior w re friends i peace and defended each other ın b ttle/(ar) nd swore o ths of fr· nds ip. (iv) Grendel and the monsters repre nt danger, evil, difficulties.

continued....

EVIDENCE

D DUCTI NS

(v) The story is about

qualities the people admired:

courage

strengt

peace

(vi) It tells us about their way

of life, ab ut

reward

boasting

hospitality

fighting

vengeance

Lesson Plans f r UNIT FOUR The axo s

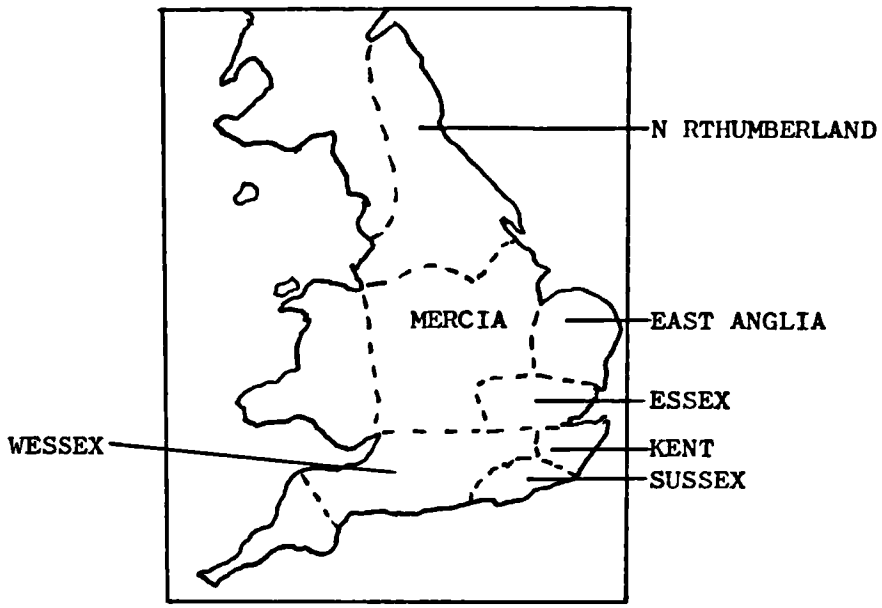
Lesson Three. How the land was governed, fter it was settled.

EVIDENCE	DEDUCTI NS
1. KING	We do not kno how the seven kingdoms were form d.
(i) Map showing seven kingdoms in 700 A.D.	
(ii) Bede and Anglo Saxon Chronicle suggest that a king chose his successor; it was not necessarily an eldest son.	We know that the kingdoms were ruled by kin , who were made king in a crowning ceremony.
(iii) They say that the king promised to serve God in a crowning ceremony.	
(iv) The kings kept control by travelling around their countries with their eldermen. (In Aethelbert of Kent's laws the 'feorm' says a lord must give hospitality to his king for 24 hours).	We can guess the kings were strong rulers, and the kingdoms were fairly pe ceful.
2. KI GS H U E OLD	
(i) Alfred divided his followers into three grou s; they would each live one month with the king, and two on their own estates.	We know th t t ere w re laws that people had to obey.
(ii) The kings council made laws: e.g. laws of Ine of Wessex Aethelbert of Kent Alfred of Wessex.	We c n gu s the l ws were different in iffer nt ki gdoms and at different times.

continued....

Lesson Three continued....

EVIDENCE	DEDUCTI NS
3. THE PEOPLE	
(i) La s of Aethelbert of Kent (7th Century): A 'ceorl' could rent or sell his land. He had to pay taxes. There were punishments for anyone who broke into his ho e. 'A laet' was half free.	We know that (i) There were laws about land, homes, cattle and crops.
(ii) Laws of the Ine of Wessex: Land could be left to your sons for three generations. He had to fence his land, and pay a neighbour if cattle strayed on to his land, but if you left your land, you had to leave half of it seeded for the lord.	(ii) Most people had some rights as well as duties.
	(iii) They had some freedom to move around. There were not completely controlled by their lord.



(iii) Map showing the 7 Saxon kingdoms

In the 6th Century Kent was the most important

In the 7th Century Northumbria was most important

In the 8th Century Mercia took the lead

In the 9th Century Wessex was the most important Kingdom.

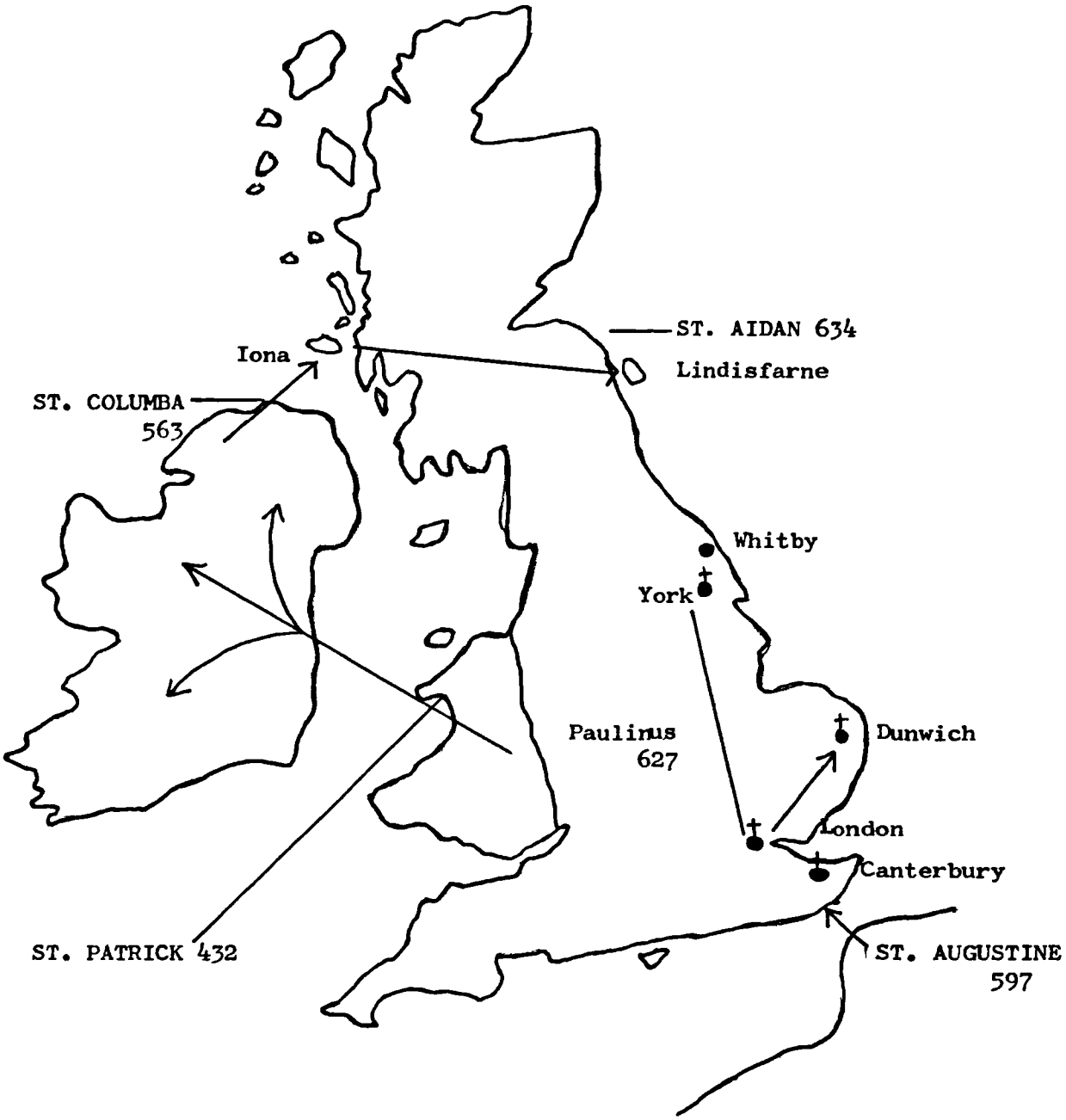
Lesson Plans for UNIT F UR The Saxons

Lesson Four. The Church (The Pre Conquest Church M. Deansley 1961)

EVIDE CE	DEDUCTIONS
1. THE CELTIC CHURCH Christianity had been introduced in the Roman Empire, but it was driven into Wales by the Saxons. (i) Map showing spread of Christianity in Britain in 5th and 6th Centuries (Deansley, M. 1961). (ii) Bede: St. Patrick captured by pirates and taken from Northern England to Ireland, escaped to Gaul, then returned as a missionary to Ireland in 342 A.D. St. Columba went to Iona to convert Picts. 563. St. Aid n went to Lindisfarne 634	We know how and wher Celtic Church spread. We can guess individual holy men influenced and taught the people in their area.
2. THE R MAN CHURCH (Bede) (i) Aet elbert of Kent married Bertha a Christian princess fro Gaul. (ii) P pe Gre ry s nt St. August'ne, a monk, to Kent where he set up a mona t ry. (iii) King Edwin of Northumbria married Aethelbert's daughter in 627. He said if he won his next bettle he would become a Christian. Later,	We know (i) mission ries came from Rome to convert peop e to Christianity. (ii) They set up monasteries and b'sho rics. iii) They convert d the kings. continued....

Lesson Four continued....

EVIDE CE	D DUCTIONS
Edwin was killed by King Perda of Mercia - a Pagan king. 663 King Oswy of Northumbria decided to join the Church of Rome and Northumbria became Christian again.	We c n guess the reasons why people became Christian (i) were often 'superstitious' pragmatic) - if they had a good catch of fish, a good harvest, or won a battle. (ii) it helped the kings to reinforce their power.
3. THE CELTIC AND ROMAN CHURCHES JOIN (i) Masons from Rome built churches in the Roman style. (ii) Latin was used for reading and writing, in the church and monasteries. (iii) Pagan and Christian carving on Celtic crosses - naturalistic designs.	We kn w (i) Christianity linked different kingdoms. (ii) Christianity linked Britain to Europe. We can guess (i) that more people could communicate with reading and writing. (ii)there was more travel.



Map showing the spread of Christianity, through the Celtic church, and the Roman church in th (5) and (6)

Lesson Plans for UNIT FOUR The Saxons

Lesson Five. Visit to Bradmore Green, Coulsdon to look for evidence of Saxon Settlement

EVIDENCE	DEDUCTIONS
1. Place names show Saxons lived in the area of Waddington - the people of Wad. Kenley - a settlement in a clearing. Coulsdon - a settlement in a valley.	We know there were many Saxon settlements in this area
2. Charters show Coulsdon settled in 675 A.D. Waddington 880 A.D. No charter record of other places until 13th Century.	We know some specific places in the area were settled in Saxon times e.g.Coulsdon. We can gue s other settlements probably kept their Saxon names but moved to a sligl tly different place, because of fire or disease, or because the soil was worn out. \e can guess that most of the villag s did not move far from the original site because the flat, cla soil was good for crops and there was a good water sup ly.

continued....

EVIDENCE	EDUCTIONS
3. Hedge-dating. Count how many different kinds of tree in every 30m. Each specie represents 100 years.	We know the e fields are 700 years old. In two hedges in Coulsdon we found 7 kinds of tree: hawthorn, e der, bullace, maple, holly, ash, hazel. We can guess that these were Saxon field boundaries, but we cannot prove it.

NAME Daniel T.F DATE 5 Dec 1985

UNIT ONE THE STONE AGES

EVIDENCE map

What do you know FOR CERTAIN from this evidence?		Level 8
they knew about the layers of the earth	Therefore they knew where to plant there crops	Conclusion they had to tell other people where to go to these bit of earth
they knew where to get clay and flints	Therefore they knew the area	
What reasonable GUESSES can you make about it?		**Level 9**
they lived near to chalk and day areas	Therefore they dident have to go far to get Flints	Conclusion they knew as ally where to live
they lived ner slopes	Therefore they wre in a plain with not many trees	
What would you LIKE TO KNOW about it?		**Level 8**
did they have simple maps in the stone age	Because it would tell us the maps started	Conclusion they knew about the areas they lived in and the layers of the ground
did they have specil people to tell you about the areas	Because it would tell us if they held RV polres	

NAME David Harrison DATE 19.3.1985

UNIT ONE THE STONE AGES

EVIDENCE DIAGRAM - STONE CIRCLE

What do you know FOR CERTAIN from this evidence? Level 3		
The Druids falt that the oak was a specral tree.	Therefore They falt that they cad clo micak.	Conclusion and they had a trackway leaded to the circle.
because the mistletoe goow on it.	Therefore and they breat a circle made it for saung there pares	

What reasonable GUESSES can you make about it? Level 6		
they mast of thousands of man to clag the stones	Therefore it mast be hard	Conclusion They mast of been clever
alang.	Therefore They mast of beenstrogman	

What would you LIKE TO KNOW about it? Level 1		
wy did they think that the ork is speshl	Because Wont to know	Conclusion They make pd out of the clay
	Because	

NAME Andrew DATE 6.12.85

UNIT ONE THE STONE AGES

EVIDENCE writing

What do you know FOR CERTAIN from this evidence?		Level 9
they communicated	Therefore they made signs for communicating	Conclusion they needed other people
they draw ..	Therefore They had thing to draw with	

What reasonable GUESSES can you make about it?		Level 8
they may of had spcshells thing to do writing with	Therefore	Conclusion they might of had spcshell hunting signs
I think it had a meaning	Therefore It migh of taken them a long time to get the writing	

What would you LIKE TO KNOW about it?		Level 6
What it ment	Because then we could make little word	Conclusion
had they got to know what the signs ment	Because then we could do stone age writing.	

Appendix XIII (iv) Control Group

NAME Louise Moretha DATE 221385

UNIT ONE THE STONE AGES

EVIDENCE PETROGLYPHS - ROCK WRITING

What do you know FOR CERTAIN from this evidence?		Level 5
They did not have words.	Therefore They used signs instead	Conclusion So people could read silently. they could not make a noise. Or they would hurt there hair it would be horrible.
they kneedid tools to right the messages.	Therefore unless it was soft they had to use tools.	

What reasonable GUESSES can you make about it?		Level 8
I guess that in different country's they had different sings.	Therefore If one want a different country it would not under stand it.	Conclusion they would not move from place to anothe
It took they a long time to carve the sings.	Therefore Unless it was a very short messags.	

What would you LIKE TO KNOW about it?		Level 5
What the signs mean.	Because I do not what they mean	Conclusion It would be fun to try them.
how they draw the signs on the wall	Because I would like to try + and see what they look like.	

APP N C XIV - XVIII

Evidence Us d ın T t . UNIT ON . The to e Ag s

ppendıx XIV — Unit On . Test One. Artefact. Palaeol'th c Fl nt H nd Ax . c. 2 ,000 BC. Slid . The Mu m of Lo d n. OL 91.

App nd'x XV — Unit One. Test Two. Pict r Font de Gaume. Sl' e. R y Delv rt, N v ill s So terraines, 10 Vill neuve, Dord n .

Append'x XVI — Unit One. Test Three. Diagram Stone Cırcle. Th Dr ids C'rcle, Caernarvon. T en from 'Stone Circles of t e British Isles' Burl, A.

Appen ix XVII — Unit On . T t Four. M p. Ar a of Nort wns ⁱins : l m S owing cl y and chalk eas, steep slopes, rıvers and site where neolithic impleme ts were fo nd.

p end'x XVIII — Un't On . T st Five. ritin . P troglyphics from It ly t k n fr m 'H rıtin B n' MacDonald Edu tion l tarters, Lo g Ago Boo s, p. 3.

Appendix XIV

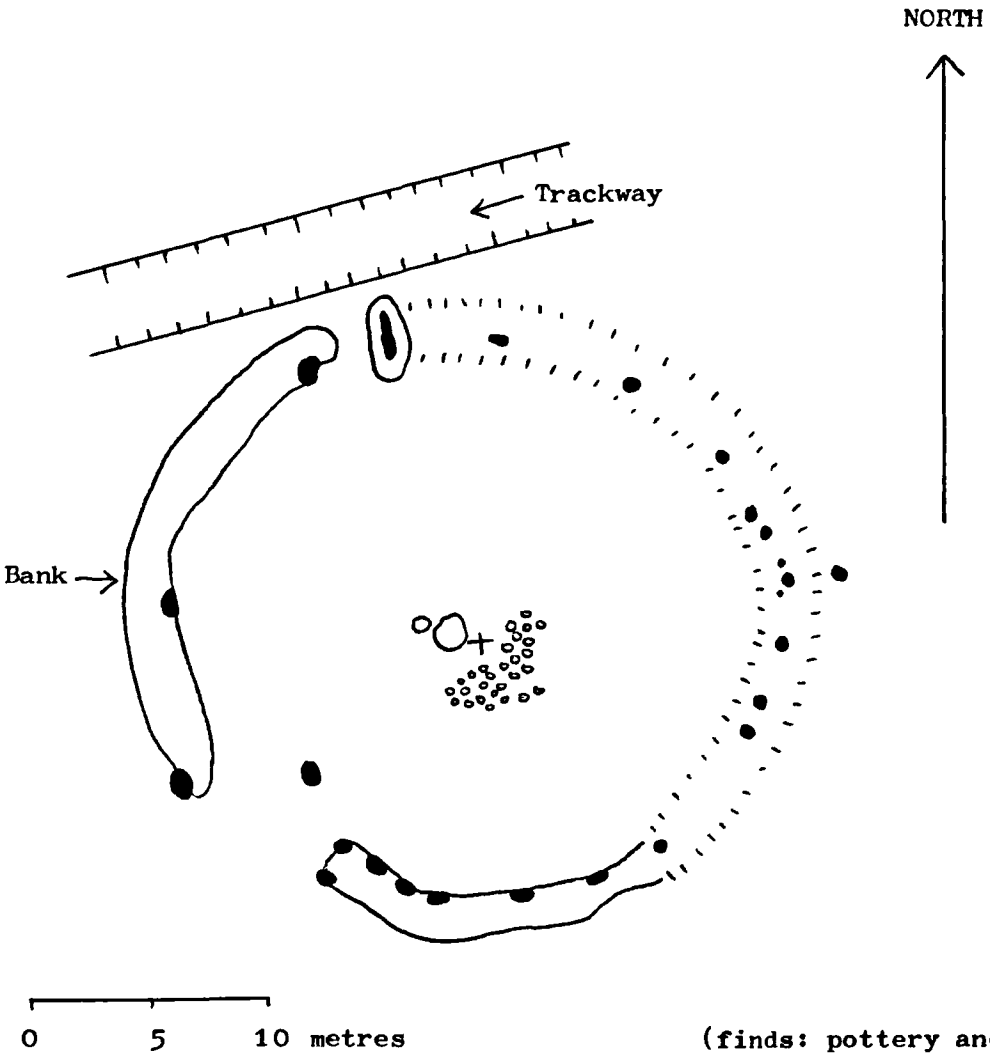
Unit One. Test One. Artefact. Palaeolithic Flint Hand Axes c 200,000. B.C. Slide. The Museum of London, OL 91.

Appendix XV

Unit One. Test Two. Picture. Font de Gaume.

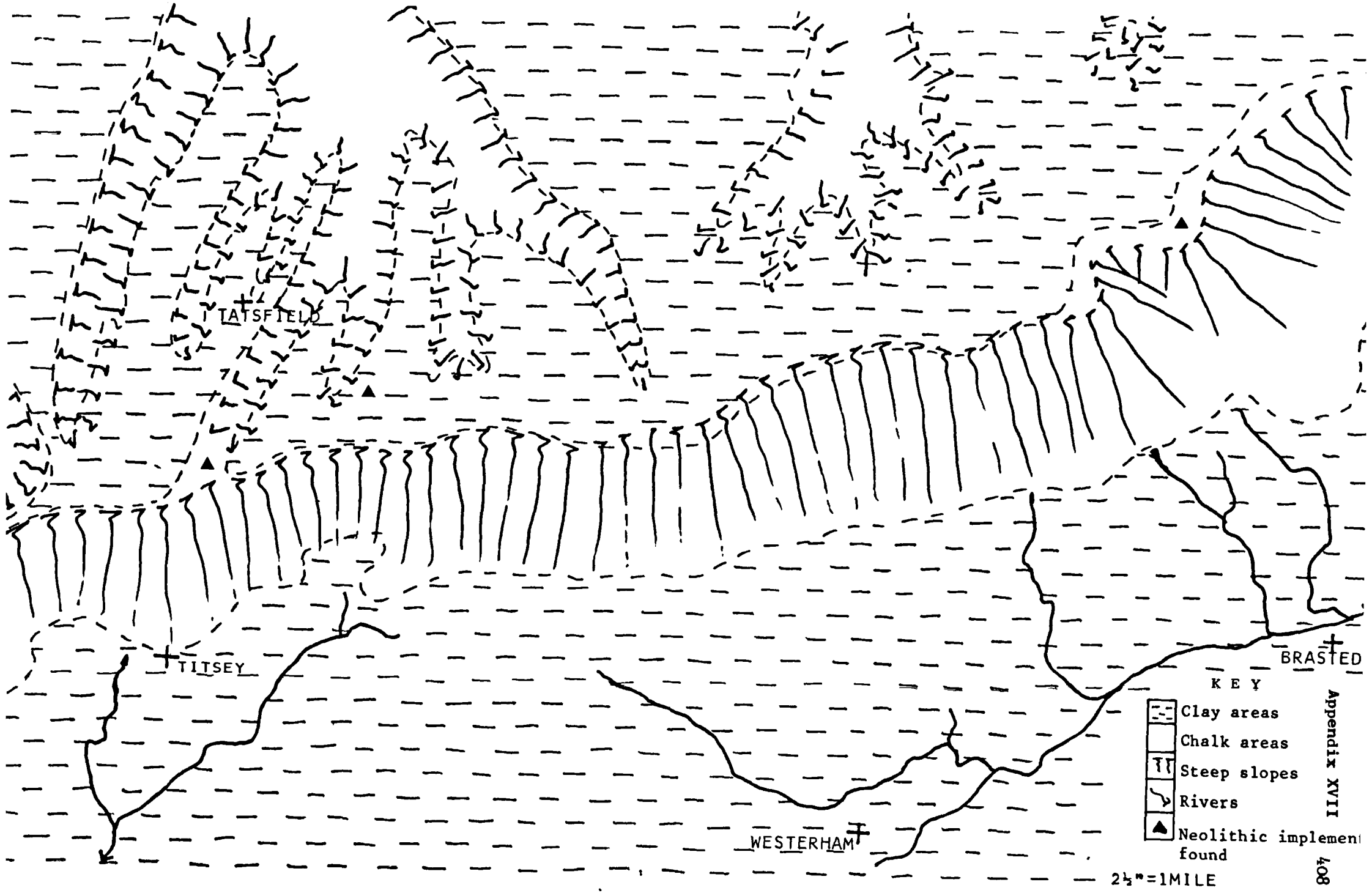
Slide. Ray Delvert, Nerveilles Souterraines, Dordogne.

Appendix XVI

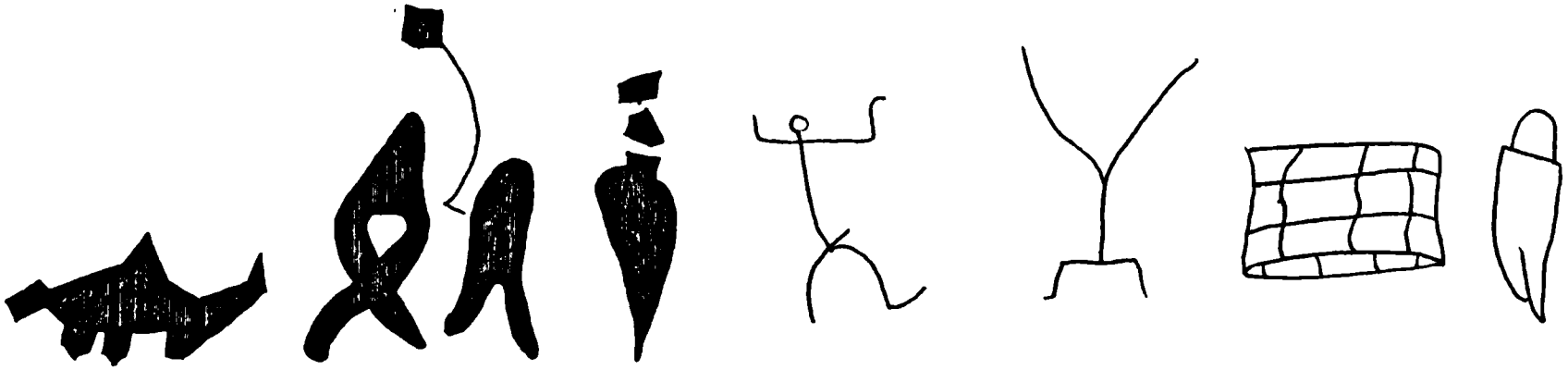


(finds: pottery and flints)

Plan of the 'Druids Circle', Caernarvonshire (After Griffiths, 1960) in 'The Stone Circles of The British Isles' by Burl, A. (excavated 1975).



Appendix XVII



"Cavemen used pictures to tell stories, and leave messages." Here are some old pictures found in Italy. They were the first kind of writing.

From 'How Writing Began' MacDonald Educational Starters Long Ago Books.

APPENDICES XIX - XXIII

Evidence Used in Tests. UNIT TWO. The Iron Age

Appendix XIX Bronze Helmet 1 B.C. (The Waterloo Helmet) Slide B.M.

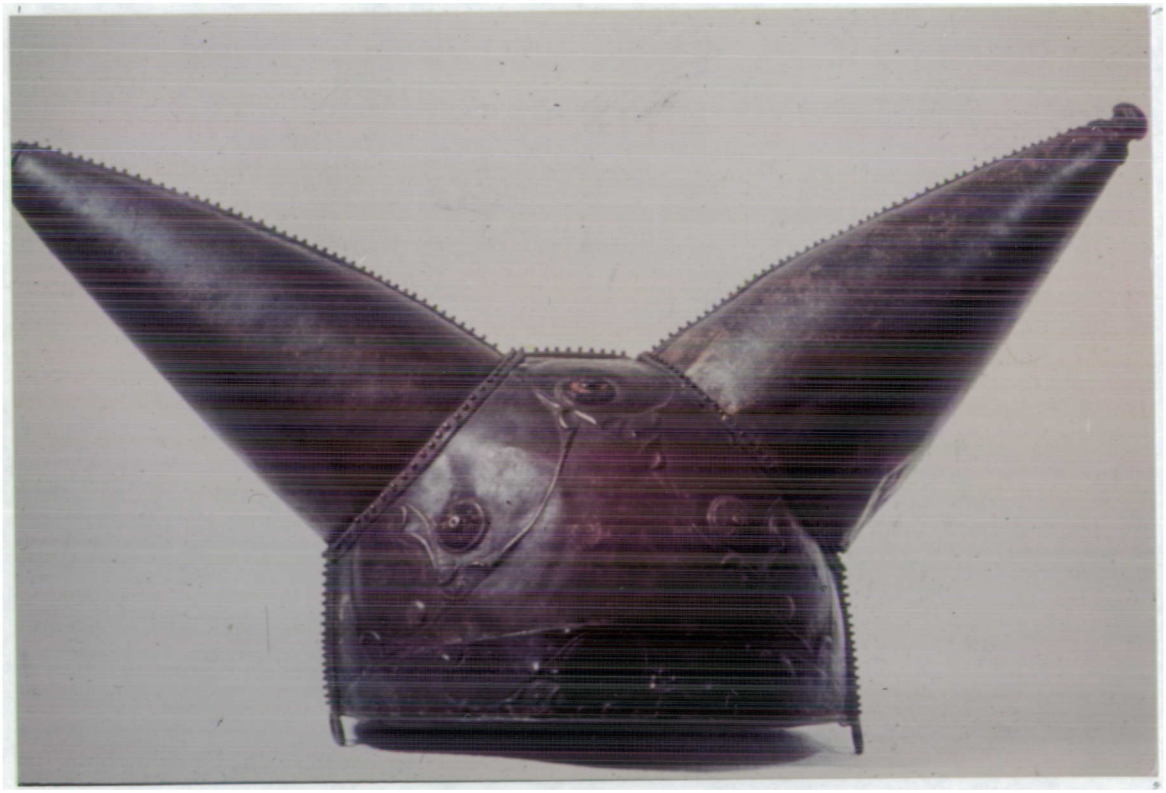
Appendix XX The Uffington Horse, Photograph.

Appendix XXI Little Woodbury, Iron Age Horse plan, Wilts, in Cunliffe, K.K., 1974.

Appendix XXII Lynchets of Iron Age Fields, Butser Hill, Hants.

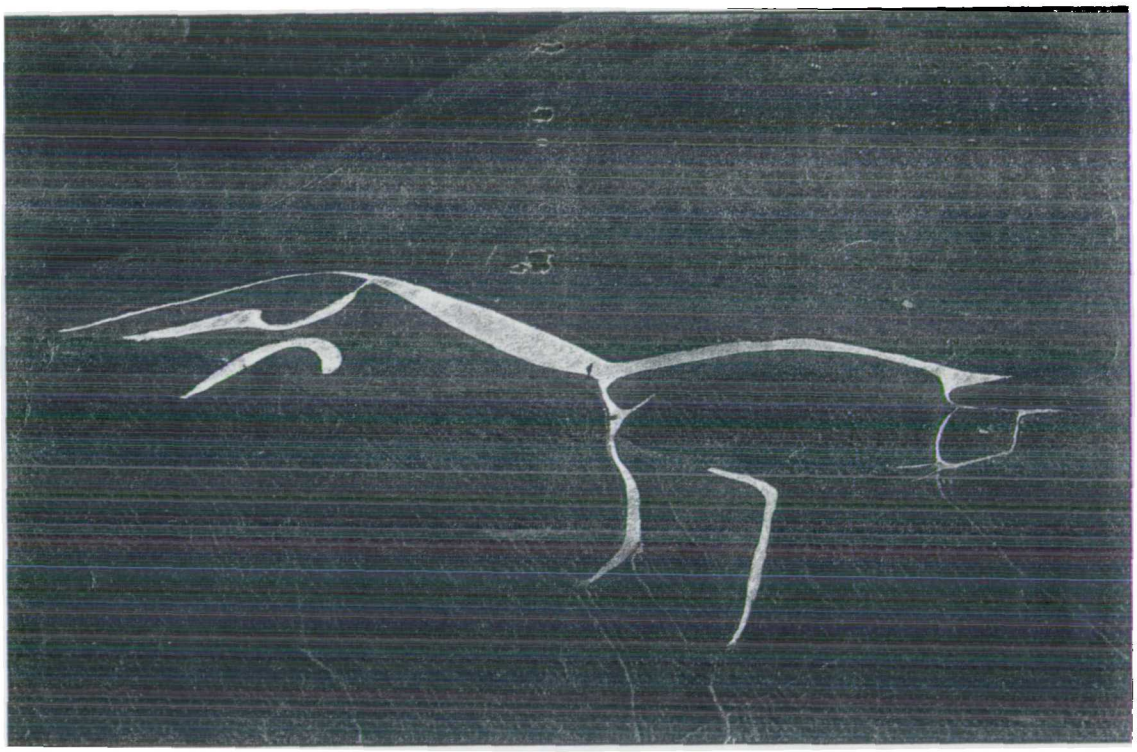
Appendix XXIII Strabo 1. 4. 2. Description of British exports.

Appendix XIX Bronze Helmet 1 B.C.

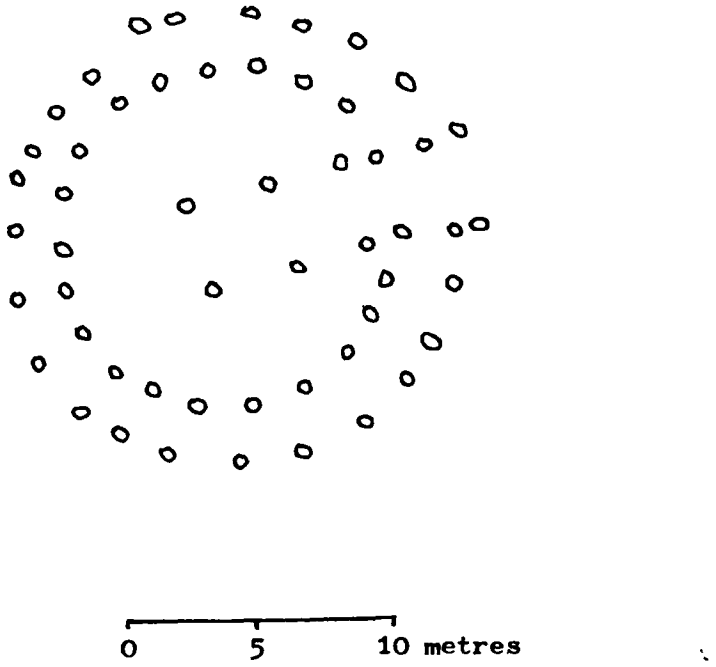


Appendix XX. Unit Two. Test Two. Picture Photograph - The Uffington Horse

FIGURES IN A LANDSCAPE

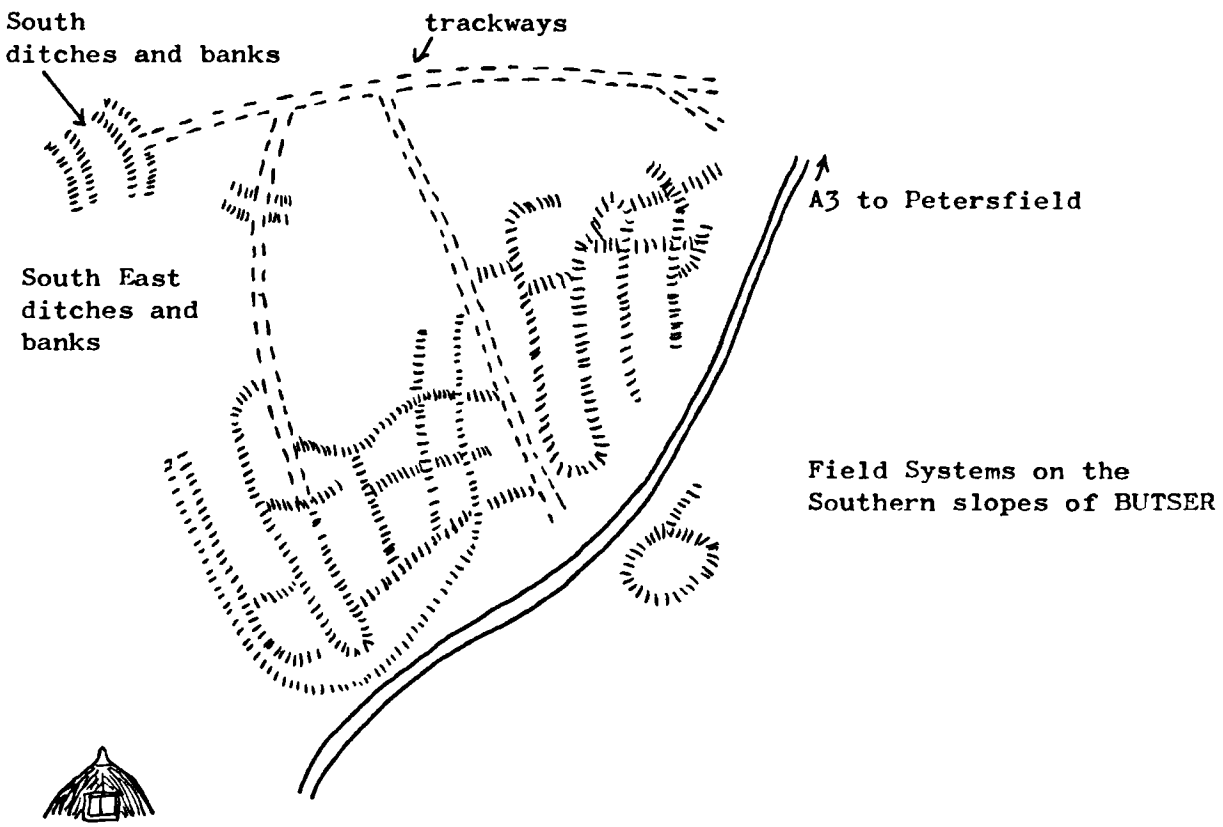


Appendix XXI Unit Two. Test Three. Diagram



Plan of an Iron Age house at Little Woodbury, Wiltshire, excavated by Bersu in 1940. The plan is found in 'The Iron Age in Lowland Britain', D. W. Harding, R.K.P. 1974.

Appendix XXII. Unit Two. Test Four. Map



Appendix XXIII

Unit Two. Test 5. STRABO 1.4.2. Writing

"Most of the island is level and well-wooded, but there are many hilly districts. It produces corn, c ttle, old, silver and iron. They are all exported, together with leather, slaves and good hunting dogs. The Gauls use these dogs, and their own, for war as well."

APPENDICES XXIV - XXVIII

Evidence U ed in Tests. UNIT THRFE. The Romans

Appendix XXIV Shield boss found in River Tyne, B.M. Slide.

Appendix XXV Detail from frieze of great dish, Mildenhall. B.M. Slide, PRB47.

Appendix XXVI Villa Plan, Chedworth, Gloucestershire.

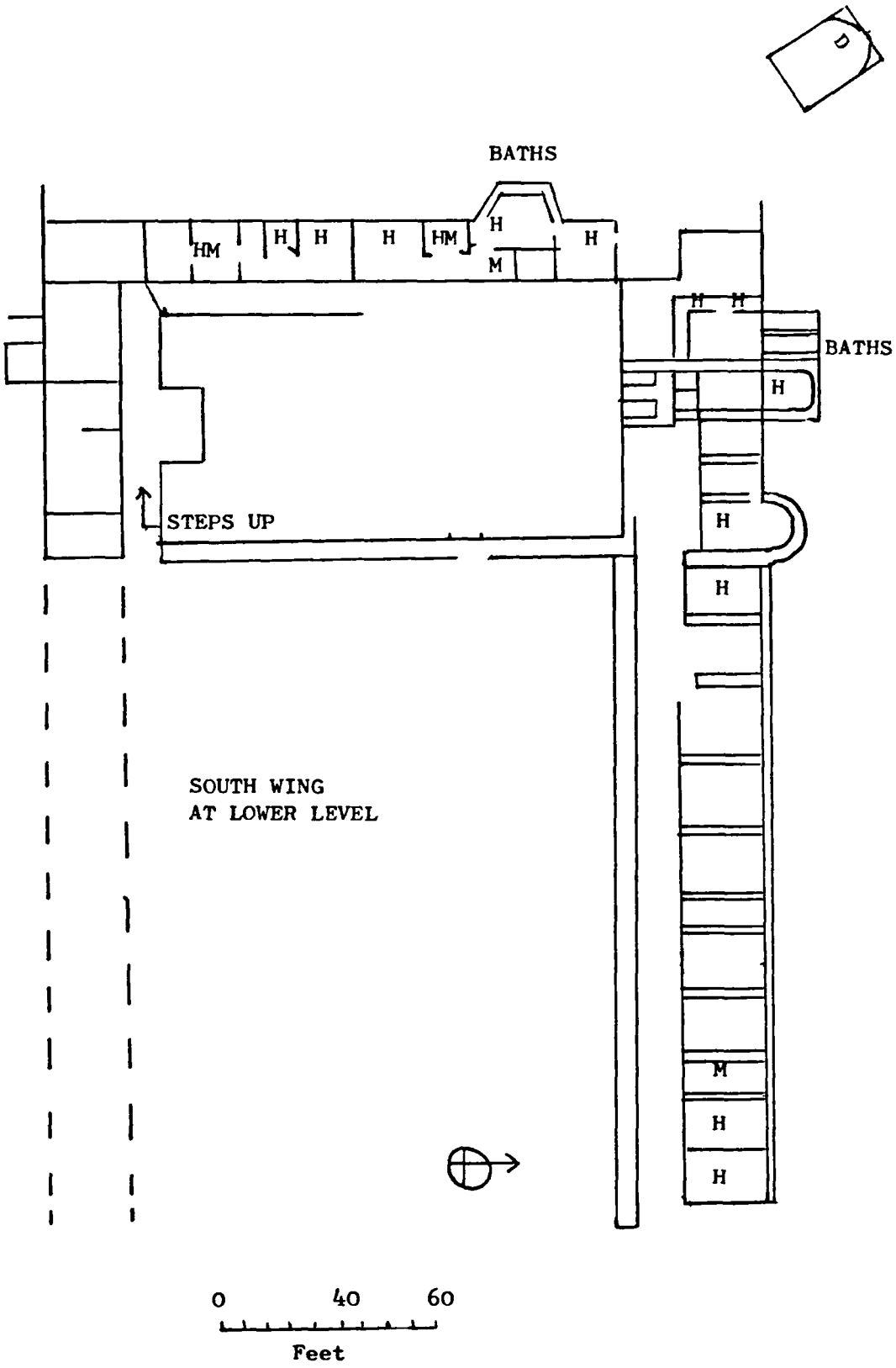
Appendix XXVII Map of Roman roads across South Downs.

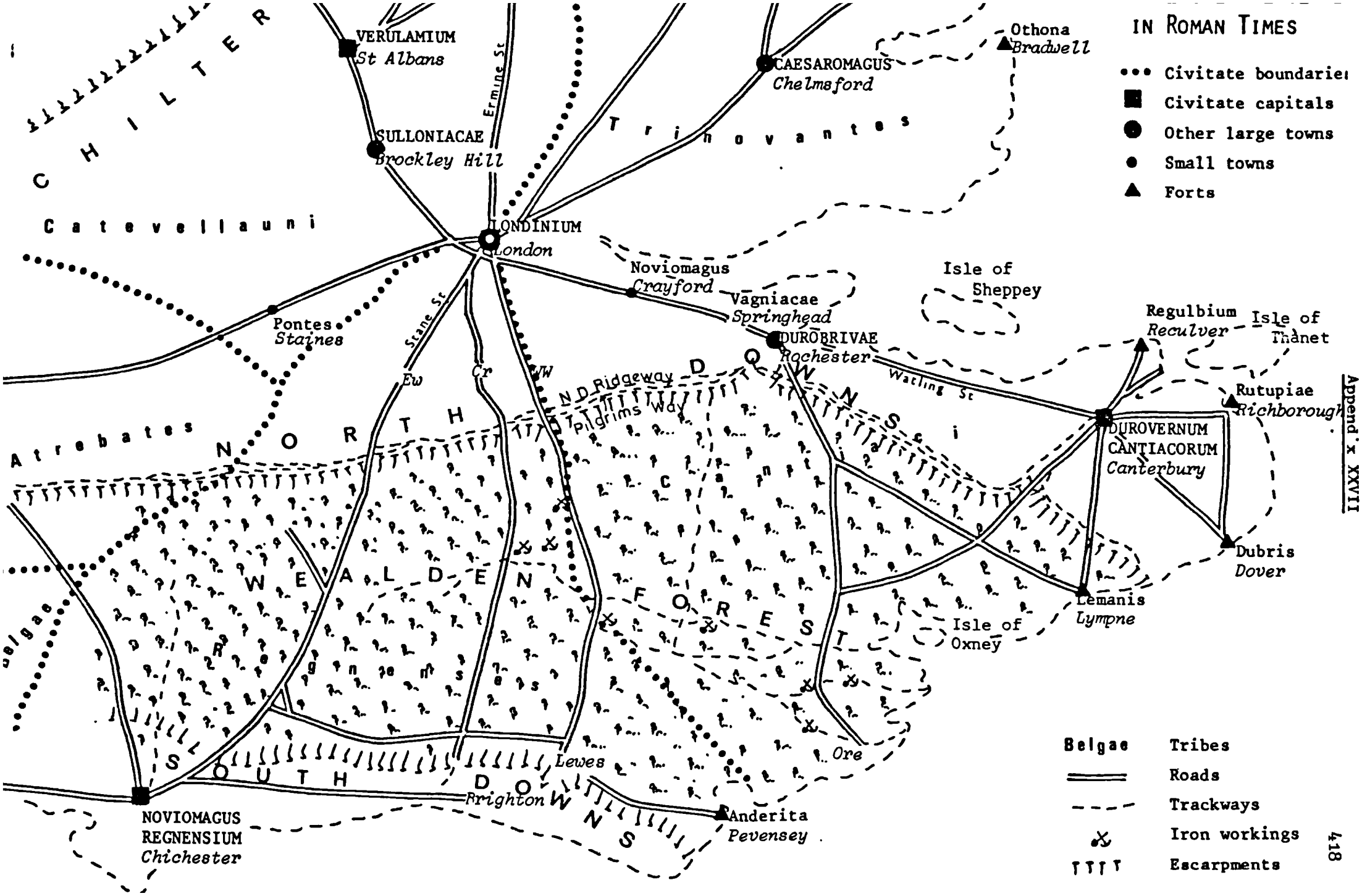
Appendix XXVIII Tacitus Annals XII 31-40 Boudiccas Revolt.

Appendices XXIV and XXV. These slides were not reproduced as photographs since the tests in Unit Three are not discussed in this thesis.

Appendix XXVI

Diagram - Plan of Chedworth Roman Villa, Gloucs.





Append. x XXVII

Appendix XXVIII

Unit Three. Writing. T citus Annals XII 31-40

At this time, for no clear reason, the statue of victory at Colchester f ll down. Women were thrown into a frenzy, and prophesied destruction, and declared that the cries of barbarians had been heard in the Senate House, that the theatre had re-echoed wıth shrıeks, a d that a mirage of t e colony had been seen, upside down, in the Thames. The ea turned blood red, and as the tide went out, objects lıke corpses were left beh'nd. All this brought hope to the Britons and fear to the veterans.

Chedworth, Gloucestershire. Tacitus Annals. XII 31-40.

Tacitus is writing about the rebellion of the Britons under Queen Boudicca in 63 A.D.

AP ENDICES XXIX - XXXIII

Evidence Used in Tests. UNIT FOUR. The Saxon

Appendix XXIX	Unit Four. Test One. Artefact Replica of Sceptre. Sutton Hoo Ship B rial. B.M. Slide MZ 18
Appendix XXX	Unit Four. Test Two. Picture Illuminated manuscript showing Harvest. B.M. Library slide made for this purpose. F 21985
Appendix XXXI	Unit Four. Test Three. Diagram Plan of the Saxon Church of Cirencester, from the Archaeology of Anglo Saxon En land ed. D. M. Wilson. Methuen 1976.
Appendix XXXII	Unit Four. Test Four. Map Map of Croydon Area in Saxon Times.
Appendix XXXIII	Unit Four. Test Five. Writing Beowulf slays the monst r Grendel. Beowulf. Penguin Cl ssics 1973. Trans. Michael Alexander. lines 824-838.

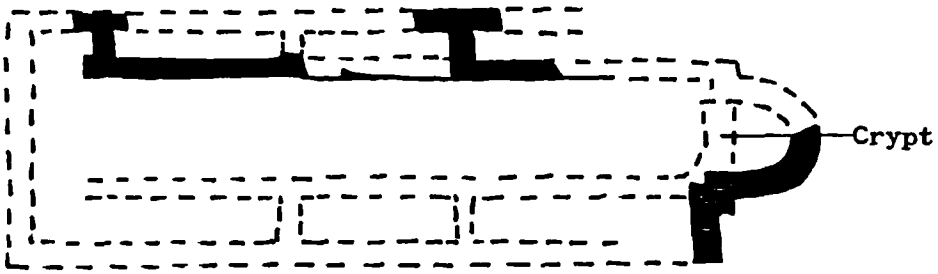
Appendix XXIX

Unit Four. Test One. Artefact. Replica of Secptre.
Sutton Hoo, Ship Burial. B.M. Slide MZ 18.

Appendix XXX

Unit Four. Test Two. Picture of Illuminated Manuscript showing harvest. B.M. Slide made for purpose of this study. F 21985

APPENDIX XXXI



10 metres

Saxon foundations

Probable Saxon walls

Plan of Saxon church at Cirencester from

'The Archaeology of Anglo-Saxon England' ed. D. M. Wilson 1976

THE AREA IN SAX N TIMES

river

dried up river

spring line

slope

don/aen = volley
ley = clearing
ing = the people of
t n = settlement
stead = farmstead

= = Spring line

Slope

SANDERSTEAD
CROYDON
BEDDINGTON
WADDON
WALLINGTON
CARSHALTON
SUTTON
CHEAM
WATTENDEN
COULSDON
CATERHAM
CHALDON
WOODMANSTERNE
BANSTEAD
CHIPSTEAD

Scale 1" = 1 mile

APPENDIX XXXIII

Beowulf Slays the Monster Grendel

(Penguin Classics 1973. lin s 824 - 838)

He had cleansed He rot. He who had
come from afar,
Deep-minded, strong hearted, he'd saved
the hall from persecution.
He was ple sed with his night's work,
The deed he had do e. Before the Danish people
The Gaet captain had made good his boast,
Had taken away their unhappiness,
The evil menace under which they lived,
Enduring it by dire constraint,
No slight affliction. As a signal to all this
The hero hung up the hand, the arm
The torn off shoulder, the entire limb,
Grendel's whole grip, below the gable roof.
There was, as I heard it, at hall next morning
A great gathering in the gift hall
to see the wonder.

A PEN ICES XXXIV - XXXVII

Evidence u ed in Empathy Te t , Units One to Four

Append'x XXXIV — The Barnack Grave. c 1,800 B.C. B.M. Postcard PR34 and drawings of grave oods.

Appendix XXXV — The Stanwick Horsema k. 1st Century A.D. B.M. Po tc rd BM/C/PR/023.

Appendix XXXVI — The children were asked to write a story called 'A Day in the Life of Lydia, a Roman Lady in Lullingstone.'

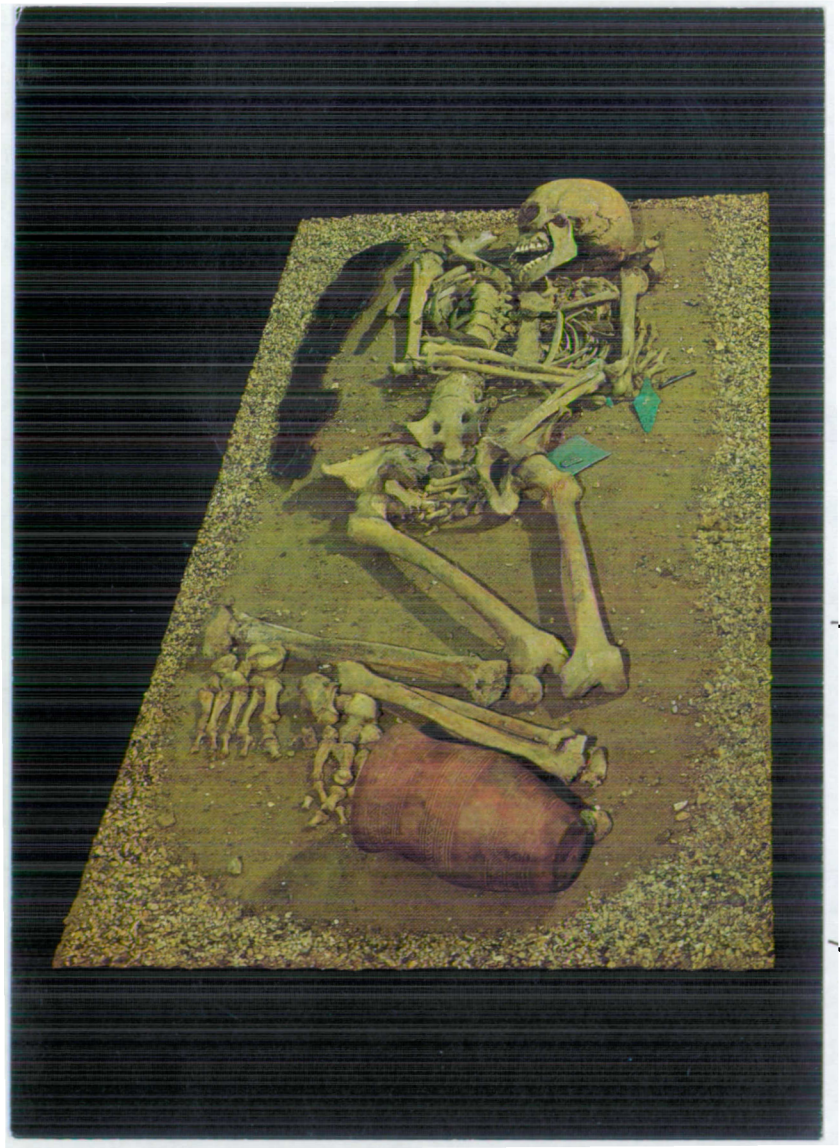
Appendix XXXVII — Bede. The Conversion of Edwin of Northumbria. The children were read an extract from Bede's 'History of the English Church' in w ich King Edwin of Northumbria consults his chief men about accepting Christianity (A 627), then as ed to write a story called "'Christianity or Idols?' The choice is yours."

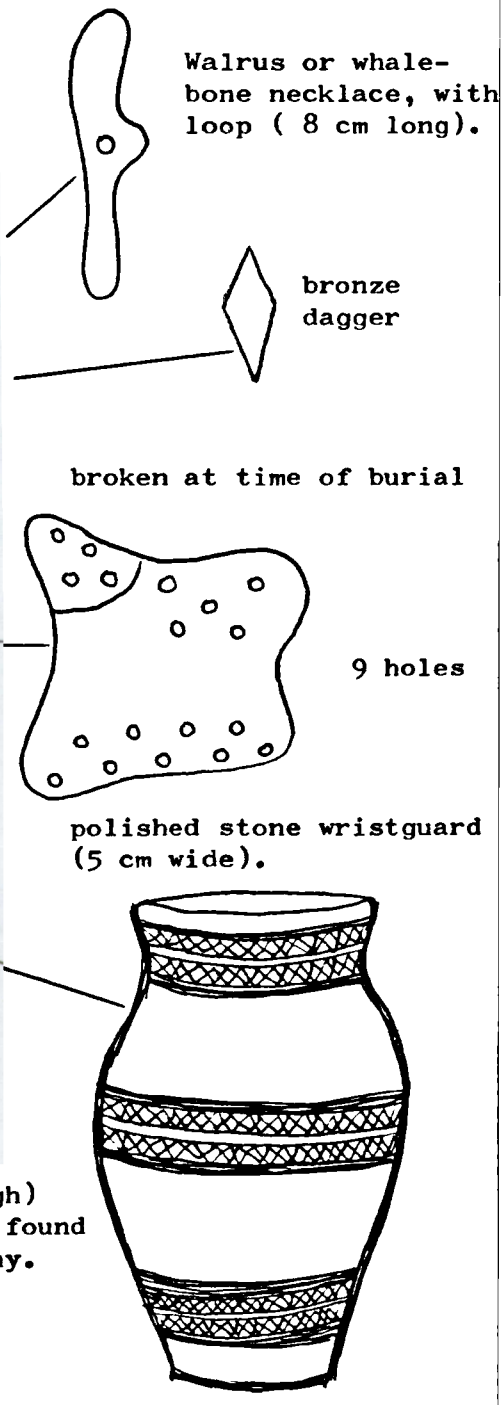
Appendix XXXIV. Unit One. The Stone Ages. Postcard

The Barnack Grave, with drawings of grave goods: pottery beaker, archer's wristguard, copper or bronze dagger, and pendant of bone or ivory, from Barnack, Cambridgeshire. c. 1,800 BC. British Museum. PR 34.

The children were asked to write a story about this evidence, called 'Death of an Archer'.

The grave was found in a river valley. There are many graves in this area. It contains the skeleton of a man. Around the skeleton are the remains of a badly-burned wooden building. The grave was covered by a mound of earth.



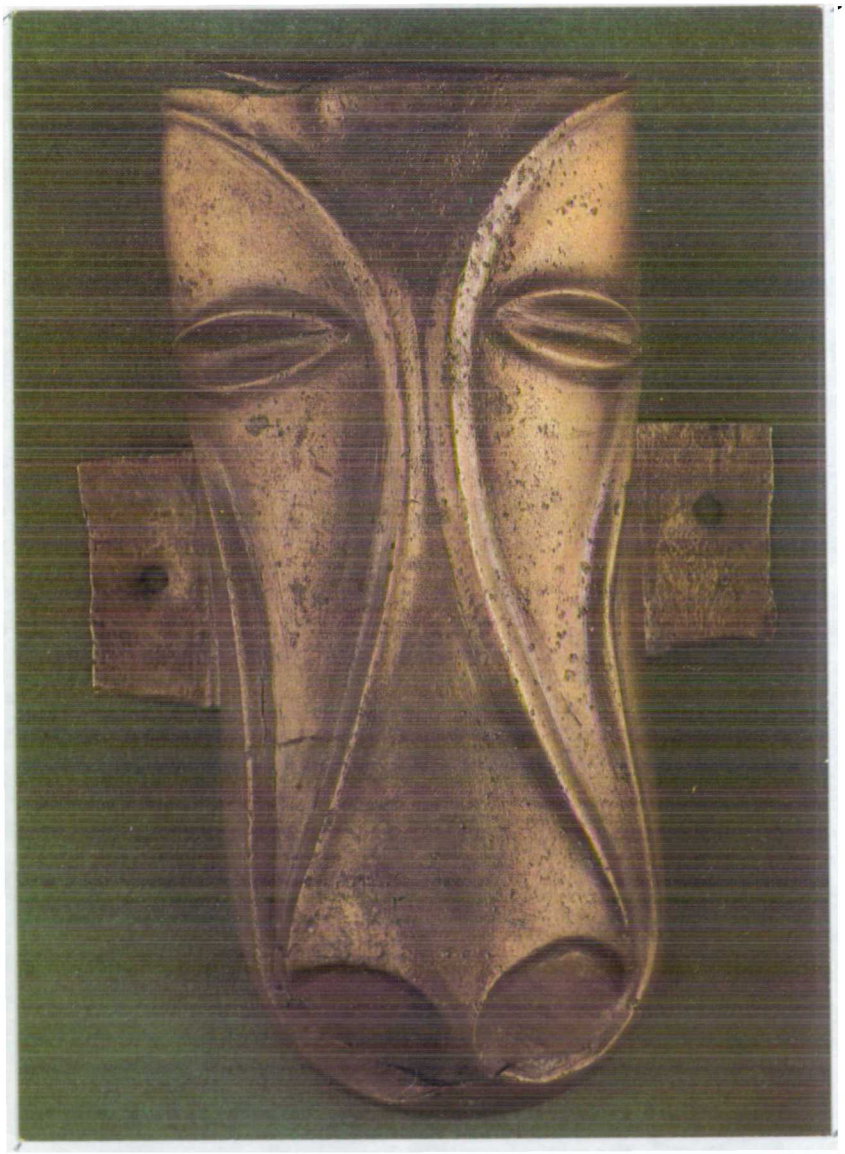


This pot (24 cm high) is similar to pots found in graves in Germany.

APPENDIX XXXV

The Stanwick Horsemask. 1st Century A.D. B.M. Postcard BM/C/PR/023.

The children were asked to write a story about the evidence called 'The Tribe of the Horse'.



APPENDIX XXXVI

The children were asked to write a story called 'A Day in the Life of Lydia, a Roman Lady in Lullingstone'. The stimulus was a visit to Lullingstone Roman Villa. Statues and votive pots containing bone and snail shell in an underground chapel, and a wall-painting of the goddesses of Spring had been discussed. No illustration given.

APPENDIX XXXVII

UNIT FOUR The Saxons

The children are read an extract from Bede's 'History of the English Church' in which King Edwin of North mbria consults his chief men bout accepting Christianity. (AD 627)

"Another of the King's chief men (ig) went on to say 'Your Majesty hen we compare the present life of man with that time of wh'ch we have no knowledge, it see s to me like the swift flight of a lone sparrow through the banqueting hall where you sit in the winter months to dine with your lords and counsellors. Inside there is a comforting fire to warm the room; outside the wintry storms of show and rain are raging. The sparrow flies swiftly in through one door of the hall and out through the other. While he is inside, he is safe from the winter storms; but after a few moments of comfort, he vanishes from sight into the darkness whence he came. Similarly, man appears on earth for a little while, but we know nothing of what went before this life, and what follows. Therefore, if this new teaching can reveal any more certain knowledge, it seems only right t at we should follow it.' The other counsellors ave the same dvice." Coifi, the chief prie t with a sword and a spear in his and, rode up to the temple on t e ki g's stallion and destoyed the old idols and burned t e temple down. The childr n ere then sked t wr'te a tory c lled 'Chri tianity or Id ls? The choice i yours'.

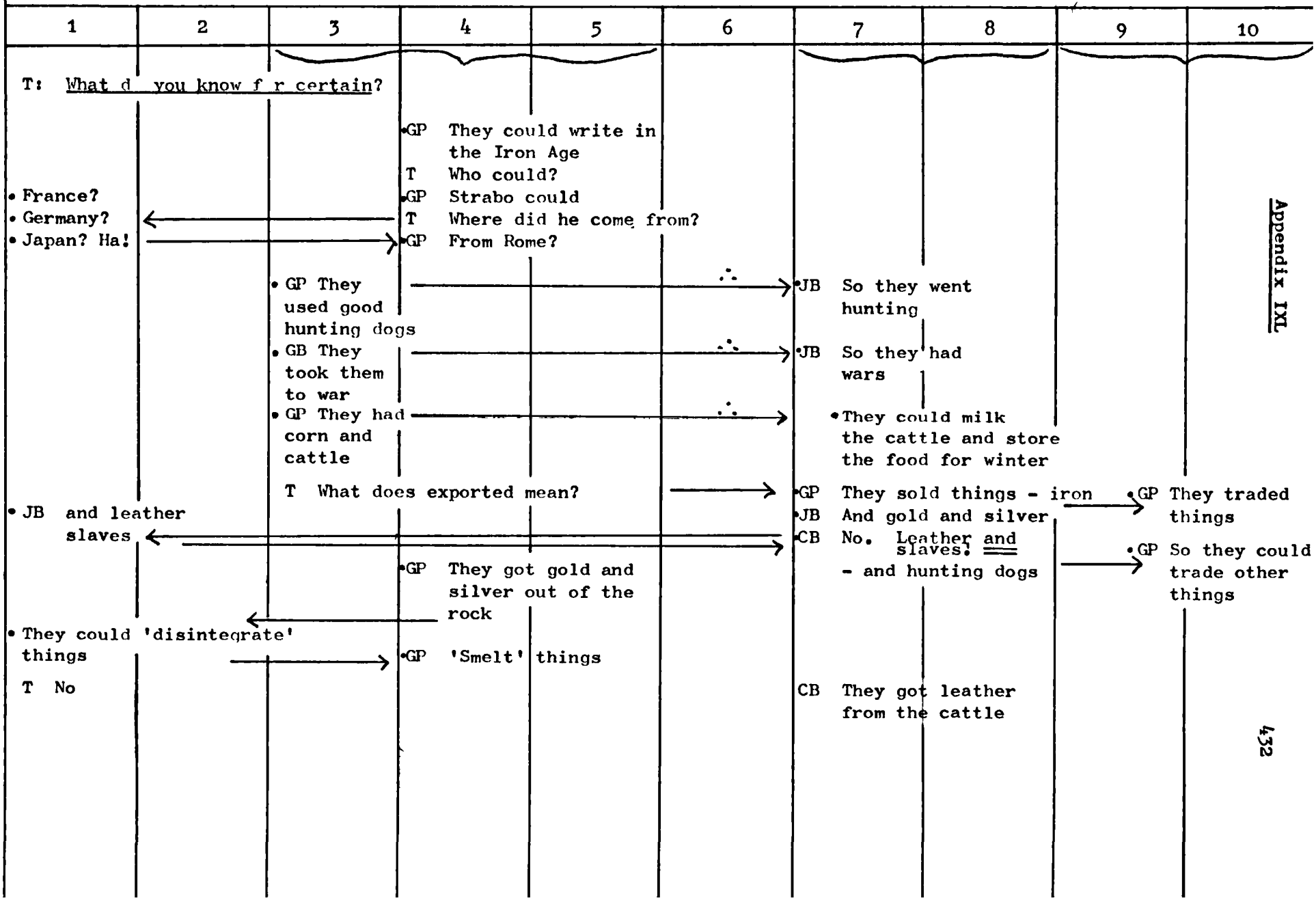
SYNOPSIS OF UNLED DISCUSSION, SHOWING HOW IT IS REPRESENTED AS A DIAGRAM - UNIT TWO TEST 5 WRITING (STRABO 1.4.2.) EXP. GROUP 2

UNLED DISCUSSION LW, JF, KB, FB, MS

1	2	3	4	5	6	7	8	9	10
		•Most of the island was wooded							
		•They produced corn and cattle			∴	→	•They could farm •They probably kept the corn in good condition •They probably had guards to stop people stealing the crops	•They probably traded corn to other countries	
			•The slaves probably worked all day						
		•There were many level districts			∴	→	•They could build houses there		
		•They had gold, silver and iron							
		•and hunting dogs			∴	→	•They probably used the dogs to keep an eye on the crops •And the cattle for meat •The corn was to make flour to make into food •And there was lots of wood to build houses •And to make their fires •They must have fed the dogs well, and kept them in good condition •They probably sent the slaves out to do the hunting.		
		•The Gauls used them for war							

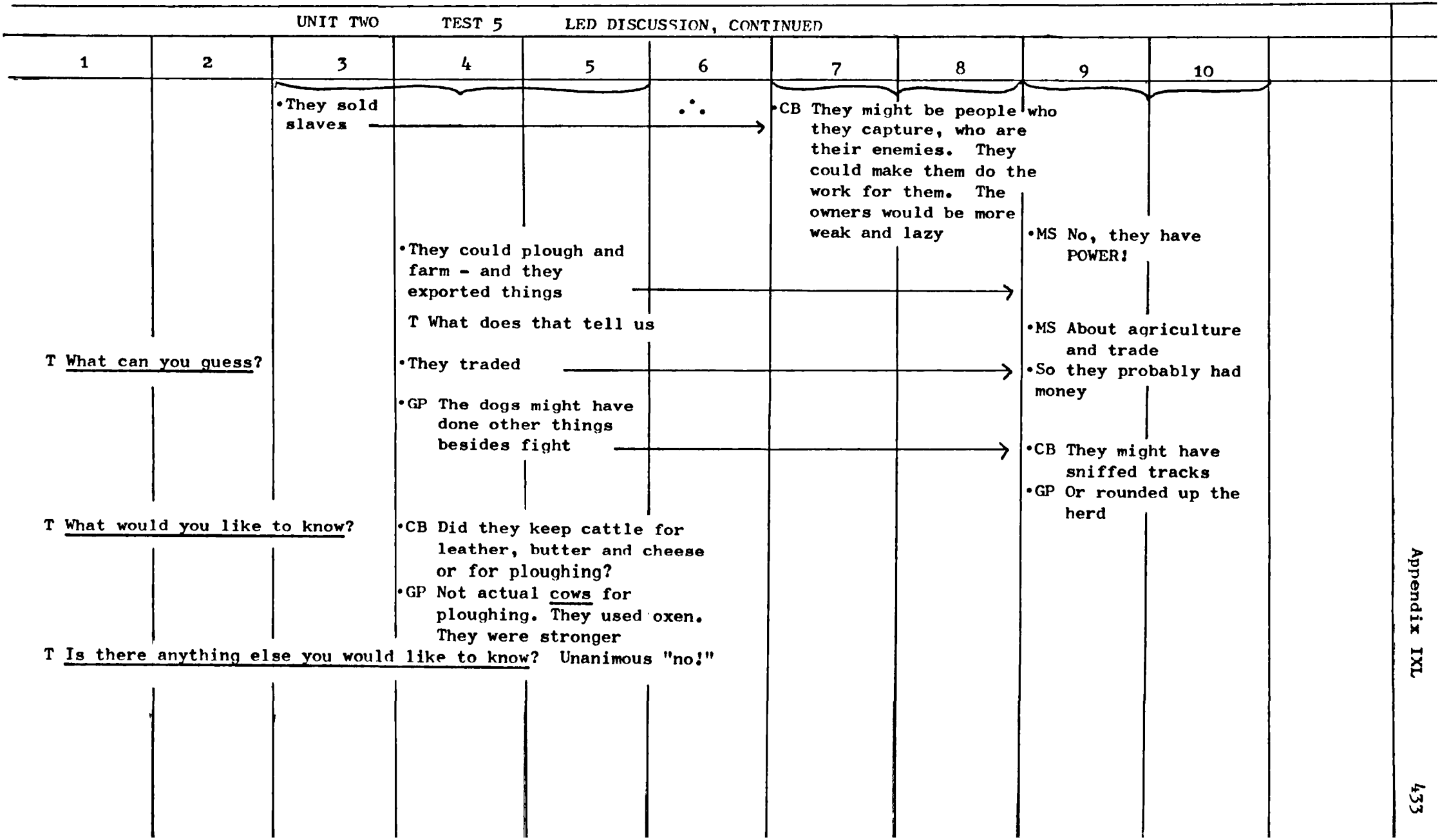
SYNOPSIS OF LED DISCUSSION, SHOWING HOW IT IS REPRESENTED AS A DIAGRAM

UNIT 2 TEST 5 LED DISCUSSION EXPERIMENTAL GROUP 1: JW, JB, GP, MS, BK, CB. T = Teacher



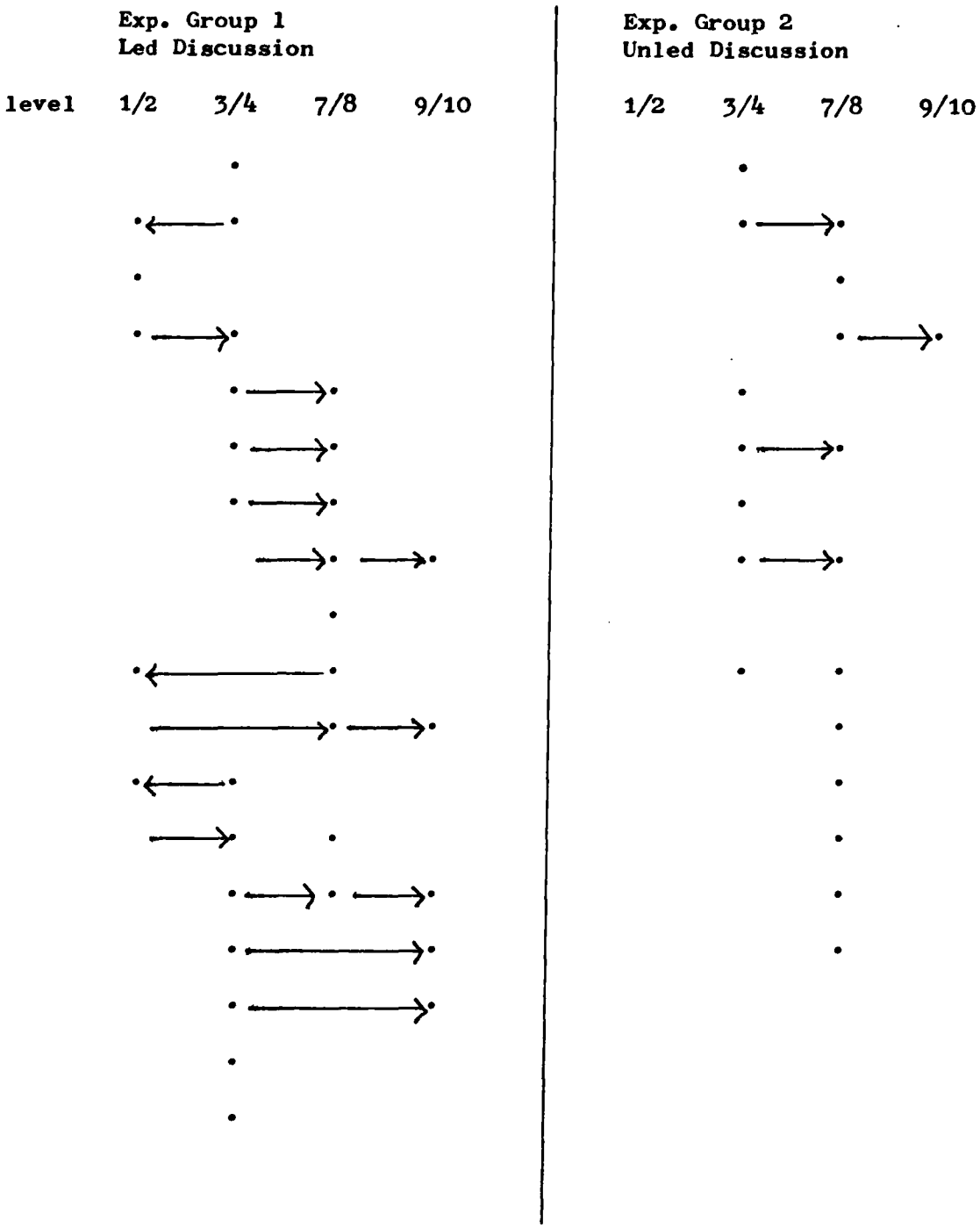
Appendix IXL

UNIT TWO TEST 5 LED DISCUSSION, CONTINUED



DIAGRAMATIC REPRESENTATION OF LED AND UNLED DISCUSSIONS

UNIT 2, TEST 5, WRITING. STRABO (1.4.2.)



APPENDIX XL

Instruction Sheet for Administration of Evidence Tests

Administration of the Tests

The tester explains how to fill in the answer sheet, step-by-step, reading the following instructions to the class. The instructions are in nine steps.

> "Pretend you are an archaeologist, trying to find out what life was like in the past. Examine this piece of evidence carefully, then fill in your record sheet. I shall pretend to be your assistant and help you, but please don't talk about it; this is top secret research, and you are surrounded by rival archaeologists!

Step 1 First consider question one. In the first section, - here - write down anything this evidence tells you FOR CERTAIN; you may think of more than one answer, so write small! (Spelling doesn't count!).

Step 2 Now read what you have written. You may be able to take your argument further, and say BECAUSE I know this, THEREFORE I also know something else. Don't worry if you can't think of anything. You may think of two things. If you can, write your answers in the second section of question one - here - .

Step 3 Now look at the third section of question one, where it says CONCLUSION. See if you can think of a short sentence, using a really good word, to sum up all the things you KNOW from this evidence.

/cont....

/cont....Appendix XL Administration of the Tests

Step 4 You have written down what you KNOW FOR CERTAIN. But we cannot always be sure about life in the past. Archaeologists often have to make sensible guesses (just as a detective makes guesses about his clues). In the first section of question two, write down what you can GUESS from this evidence, even though you cannot prove it. (You may think of two things).

Step 5 In the next section of question two, try to think if your guesses can be taken a stage further. Because you have made one guess, THEREFORE you may also guess something further.

Step 6 In the third section of question two, see if you can think of a short sentence, suing a good word, to sum up all your guesses.

Step 7 Now we're up to question three. There are many things which an archaeologist will never know the answer to, because he is finding out about a time so long ago, and there are not many clues left. Think of a question (or two!) about this evidence, to which you would really like to know the answer, in order to help you to understand what life was really like in the past, but which you cannot answer. Write it down in the first section - here - . (Two things if possible!).

Step 8 In the next section - here - write why you would like to know these things.

Step 9 In the third section, write a short sentence, using a good word, to sum up all the things you would LIKE TO KNOW about this evidence.

This concludes your research for today. I should like to thank all the archaeologists present. We shall be meeting tomorrow, at the same time, to study more evidence. The results of your studies will be carefully analysed at the University! Thank you!"

Appendix XLI

Graphs

/cont....

Appendix XLI continued/2 Page

Appendix XLII

Page

Tables of Statistical Analyses

Appendix XLIII

Other tables

Appendix XLIV

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Diagrams

Appendix XLVI Data Used in Statistical Analyses Page

Appendix XLVI(i)

One way analysis of variance of NFER NVR BD Test 28 between control and two experimental groups.

DESCRIPTIVE STATISTICS

Dataset: NVR BD: Ex 1

Date: 01-14-1990
Time: 18:07:33

DATA

102.000
129.000
129.000
133.000
86.000
116.000
105.000
102.000
97.000
104.000
123.000
122.000
102.000
96.000
88.000
107.000
117.000
88.000
105.000
80.000

Total N = 20

RESULTS

Mean =	106.550		
Variance =	237.208	s.d. =	15.402
Range =	54.000	Skewness =	0.12
Median =	104.500	Computed Mode =	100.400

If Skewness = 0 distribution is not necessarily symmetrical.
The Computed Mode may disguise the fact that the distribution is bimodal.

FREQUENCIES IN CATEGORIES.

CATEGORY	VALUE	FREQUENCY
1	80.000	1
2	86.000	1
3	88.000	2
4	96.000	1
5	97.000	1
6	102.000	3
7	104.000	1
8	105.000	2
9	107.000	1
10	116.000	1
11	117.000	1
12	122.000	1
13	123.000	1
14	129.000	2
15	133.000	1

DESCRIPTIVE STATISTICS

Dataset: NVR BD Exptl 2

Date: 01-14-1990
Time: 18:10:37

DATA

135.000
129.000
125.000
115.000
128.000
111.000
114.000
120.000
120.000
120.000
111.000
105.000
105.000
98.000
99.000
108.000
102.000
91.000
100.000
88.000

Total N = 20

RESULTS

Mean =	111.200		
Variance =	167.221	s.d. =	12.931
Range =	48.000	Skewness =	0.03
Median =	111.000	Computed Mode =	110.600

If Skewness = 0 distribution is not necessarily symmetrical.
The Computed Mode may disguise the fact that the distribution is bimodal.

FREQUENCIES IN CATEGORIES.

CATEGORY	VALUE	FREQUENCY
1	88.000	1
2	91.000	1
3	98.000	1
4	99.000	1
5	100.000	1
6	102.000	1
7	105.000	2
8	108.000	1
9	111.000	2
10	114.000	1
11	115.000	1
12	120.000	3
13	125.000	1
14	128.000	1
15	129.000	1
16	135.000	1

DESCRIPTIVE STATISTICS

Dataset: NVR BD: Control

Date: 01 14-1990
Time: 18:12:05

DATA

136.000
136.000
133.000
129.000
127.000
122.000
119.000
115.000
114.000
113.000
107.000
107.000
106.000
106.000
105.000
105.000
104.000
95.000
87.000
75.000

Total N = 20

RESULTS

Mean =	112.050		
Variance =	254.576	s.d. =	15.955
Range =	62.000	Skewness =	-0.34
Median =	110.000	Computed Mode =	105.900

If Skewness = 0 distribution is not necessarily symmetrical.
The Computed Mode may disguise the fact that the distribution is bimodal.

FREQUENCIES IN CATEGORIES.

CATEGORY	VALUE	FREQUENCY
1	75.000	1
2	87.000	1
3	95.000	1
4	104.000	1
5	105.000	2
6	106.000	2
7	107.000	2
8	113.000	1
9	114.000	1
10	115.000	1
11	119.000	1
12	122.000	1
13	127.000	1
14	129.000	1
15	133.000	1
16	136.000	2

DESIGN THREE - ONE WAY ANOVA - EQUAL SIZE GROUPS

Dataset: NVR BD: Ex1 Ex2 and Cont

DATA

GROUP 1	2	3
102.000	135.000	136.000
129.000	129.000	136.000
129.000	125.000	133.000
133.000	115.000	129.000
86.000	128.000	127.000
116.000	111.000	122.000
105.000	114.000	119.000
102.000	120.000	115.000
97.000	120.000	114.000
104.000	120.000	113.000
123.000	111.000	107.000
122.000	105.000	107.000
102.000	105.000	106.000
96.000	98.000	106.000
88.000	99.000	105.000
107.000	108.000	105.000
117.000	102.000	104.000
88.000	91.000	95.000
105.000	100.000	87.000
80.000	88.000	75.000

THE MEANS OF THE GROUPS ARE AS FOLLOWS:

GROUP 1 Mean = 106.550
GROUP 2 Mean = 111.200
GROUP 3 Mean = 112.050

ANALYSIS OF VARIANCE TABLE

SOURCE	SS	DF	MS	F
BETWEEN	350.63	2	175.31	0.80
WITHIN	12521.13	57	219.67	
TOTAL	12871.75	59		

Appendix XLVI (ii) **Analysis of covariance of Saxon Unit questions 1-3**
Test 1 (artefact)
A = groups
B = questions

ANALYSIS OF COVARIANCE. TWO WAY - REPEATED MEASURES - EQUAL GROUPS

DATA

B (REPEATED MEASURES)

	1		2		3	
A						
S						
	X	Y	X	Y	X	Y
1						
1	136	4	136	8	136	6
2	136	5	136	7	136	2
3	133	4	133	9	133	5
4	129	2	129	8	129	5
5	127	8	127	8	127	5
6	122	2	122	8	122	8
7	119	7	119	7	119	5
8	115	7	115	6	115	6
9	114	3	114	6	114	6
10	113	2	113	5	113	5
11	107	1	107	2	107	6
12	107	4	107	6	107	1
13	106	4	106	7	106	6
14	106	4	106	4	106	5
15	105	4	105	7	105	4
16	105	2	105	6	105	4
17	104	4	104	6	104	6
18	95	4	95	6	95	5
19	87	4	87	6	87	4
20	75	3	75	6	75	5
2						
21	102	7	102	8	102	6
22	129	9	129	9	129	6
23	129	6	129	8	129	8
24	133	8	133	5	133	8
25	86	9	86	8	86	6
26	116	5	116	5	116	7
27	105	6	105	8	105	6
28	102	8	102	6	102	6
29	97	4	97	2	97	2
30	104	6	104	9	104	9
31	123	10	123	8	123	7
32	122	7	122	7	122	8
33	102	6	102	5	102	6
34	96	9	96	8	96	6
35	88	6	88	8	88	7
36	107	9	107	7	107	5
37	117	5	117	6	117	5
38	88	7	88	9	88	5
39	105	9	105	8	05	6
40	80	3	80	4	80	0

	3					
41	135	6	135	6	135	8
42	129	8	129	8	129	9
43	125	7	125	8	125	6
44	115	7	115	7	115	2
45	128	9	128	7	128	6
46	111	4	111	5	111	6
47	114	7	114	8	114	7
48	120	9	120	8	120	9
49	120	6	120	7	120	5
50	120	9	120	8	120	8
51	111	8	111	8	111	5
52	105	7	105	7	105	5
53	105	7	105	6	105	5
54	98	8	98	7	98	5
55	99	8	99	8	99	6
56	108	6	108	0	108	0
57	102	5	102	4	102	2
58	91	5	91	5	91	0
59	100	9	100	6	100	6
60	88	9	88	8	88	7

MEANS AND ADJUSTED MEANS FOR TREATMENTS.

	MEAN	ADJUSTED MEAN
Treatment a 1	5.083	5.007
Treatment a 2	6.600	6.721
Treatment a 3	6.367	6.321
Treatment b 1	6.017	6.017
Treatment b 2	6.617	6.617
Treatment b 3	5.417	5.417

As there is no b(W there is no adjustment to means of levels of B.

(1) CELL MEANS.

a 1 b 1	=	3.900
a 1 b 2	=	6.400
a 1 b 3	=	4.950
a 2 b 1	=	6.950
a 2 b 2	=	6.900
a 2 b 3	=	5.950
a 3 b 1	=	7.200
a 3 b 2	=	6.550
a 3 b 3	=	5.350

(2) CELLS (ADJUSTED MEANS).

a 1 b 1	=	3.824
a 1 b 2	=	6.324
a 1 b 3	=	4.874
a 2 b 1	=	7.071
a 2 b 2	=	7.021
a 2 b 3	=	6.071
a 3 b 1	=	7.155
a 3 b 2	=	6.505
a 3 b 3	=	5.305

Appendix XLVI (ii) continued /3

Since the tests for adjusted means and adjusted cell means are complex, consult Winer (1971) pp 800+.

Values needed for various tests are:

$S^2(p)$ = 6.83

$s^2(w)$ = 2.03

nq = 60

mp = 60

P (xx)= 37563.25

E (xx)= 0.25

n= 20

Appendix XLVI(iii) Analysis of covariance on the first question of each set (B = repeated measures) across the 3 groups

ANALYSIS OF COVARIANCE. TWO WAY - REPEATED MEASURES - EQUAL GROUPS

		DATA				
	B	(REPEATED MEASURES)				
	1		2		3	
A						
S						
	X	Y	X	Y	X	Y
1						
1	136	4	136	4	136	6
2	136	5	136	7	136	9
3	133	4	133	7	133	8
4	129	2	129	6	129	6
5	127	8	127	2	127	6
6	122	2	122	6	122	5
7	119	7	119	4	119	9
8	115	7	115	5	115	6
9	114	3	114	3	114	3
10	113	2	113	7	113	2
11	107	1	107	6	107	4
12	107	4	107	5	107	3
13	106	4	106	6	106	5
14	106	4	106	7	106	7
15	105	4	105	7	105	4
16	105	2	105	7	105	0
17	104	4	104	4	104	7
18	95	4	95	5	95	2
19	87	4	87	4	87	7
20	75	3	75	0	75	6
2						
21	102	7	102	8	102	8
22	129	9	129	9	129	8
23	129	6	129	7	129	7
24	133	8	133	7	133	9
25	86	9	86	7	86	8
26	116	5	116	6	116	4
27	105	6	105	4	105	4
28	102	8	102	8	102	8
29	97	4	97	8	97	7
30	104	6	104	9	104	7
31	123	10	123	9	123	7
32	122	7	122	7	122	7
33	102	6	102	7	102	7
34	96	9	96	8	96	7
35	88	6	88	5	88	8
36	107	9	107	8	107	7
37	117	5	117	5	117	7
38	88	7	88	8	88	5
39	105	9	105	9	105	8
40	80	3	80	4	80	4

1

3

41	135	6	135	9	135	8
42	129	8	129	9	129	8
43	125	7	125	7	125	7
44	115	7	115	6	115	5
45	128	9	128	8	128	9
46	111	4	111	7	111	3
47	114	7	114	7	114	5
48	120	9	120	7	120	8
49	120	6	120	8	120	9
50	120	9	120	10	120	9
51	111	8	111	8	111	9
52	105	7	105	8	105	7
53	105	7	105	8	105	5
54	98	8	98	8	98	7
55	99	8	99	7	99	8
56	108	6	108	7	108	4
57	102	5	102	6	102	3
58	91	5	91	9	91	5
59	100	9	100	8	100	8
60	88	9	88	7	88	7

B (REPEATED MEASURES)

4 5

A

S

	X	Y	X	Y
	1			
1	136	8	136	6
2	136	3	136	5
3	133	7	133	7
4	129	7	129	5
5	127	8	127	7
6	122	7	122	7
7	119	5	119	7
8	115	7	115	8
9	114	5	114	7
10	113	7	113	5
11	107	3	107	7
12	107	7	107	5
13	106	7	106	4
14	106	7	106	4
15	105	5	105	5
16	105	6	105	6
17	104	7	104	6
18	95	6	95	7
19	87	3	87	5
20	75	1	75	3

1	2				
21	102	8	102	4
22	129	8	129	9
23	129	7	129	7
24	133	9	133	7
25	86	8	86	7
26	116	7	116	7
27	105	5	105	5
28	102	9	102	7
29	97	7	97	8
30	104	7	104	8
31	123	8	123	9
32	122	7	122	4
33	102	9	102	2
34	96	8	96	3
35	88	5	88	5
36	107	7	107	6
37	117	6	117	5
38	88	7	88	7
39	105	7	105	0
40	80	3	80	1

3				
41	135	9	135	6
42	129	9	129	9
43	125	2	125	8
44	115	2	115	8
45	128	9	128	9
46	111	5	111	3
47	114	9	114	8
48	120	7	120	8
49	120	10	120	8
50	120	7	120	8
51	111	7	111	8
52	105	7	105	7
53	105	6	105	8
54	98	8	98	9
55	99	2	99	2
56	108	4	108	8
57	102	4	102	2
58	91	7	91	3
59	100	9	100	8
60	88	8	88	9

MEA S A D ADJUSTED MEA S F R TREATME TS.

	MEAN	AD STED MEAN
Tr atment a 1	5.170	5.087
Treatmen a 2	6.720	6.852
Tr tment a 3	7.020	6.971
Treatment b 1	6.017	6.017
Treatment b 2	6.650	6.650
Treatment b 3	6.267	6.267
Treatment b 4	6.483	6.483
Tre tment b 5	6.100	6.100

As there is no b(W) there is no adjustment to means of levels of B.

(1) CELL EANS.

a 1 b 1	=	3.900
a 1 b 2	=	5.100
a 1 b 3	-	5.250
a 1 b 4	=	5.800
a 1 b 5	=	5.800
a 2 b 1	=	6.950
a 2 b 2	=	7.150
a 2 b 3	=	6.850
a 2 b 4	=	7.100
a 2 b 5	=	5.550
a 3 b 1	=	7.200
a 3 b 2	=	7.700
a 3 b 3	=	6.700
a 3 b 4	=	6.550
a 3 b 5	-	6.950

2) CELLS (ADJUSTED MEANS)

a 1 b 1	=	3.817
a 1 b 2	=	5.017
a 1 b 3	=	5.167
a 1 b 4	-	5.717
a 1 b 5	-	5.717
a 2 b 1		7.082
a 2 b 2		7.282
a 2 b 3	-	6.982
a 2 b 4	-	7.232
a 2 b 5	=	5.682
a 3 b 1	-	7.151
a 3 b 2	=	7.651
a 3 b 3	-	6.651
a 3 b 4	=	6.501
a 3 b 5	-	6.901

Since the tests for adjusted means and adjusted cell means are com lex, consult W ner (1971) pp800+.

Val es needed for various tests are:

s^2_p)		8.16
s^2_w)	=	2.59
nq	-	100
np	-	60
P xx)	=	62605.50
E(xx)	-	NO VAL E
n		20

Unit 1, The Stone Age

Three way analysis of variance - one between groups and two within groups (question type and type of evidence)

DESIGN 11A - THREE WAY ANOVA - MIXED: 1B 2W

DATA

		A				
		1		2		3
	C					
	S		S		S	
B						
1						
	1					
	1	7	21	8	41	9
	2	6	22	6	42	9
	3	8	23	7	43	7
	4	6	24	6	44	6
	5	7	25	2	45	8
	6	5	26	6	46	5
	7	6	27	2	47	9
	8	2	28	6	48	8
	9	8	29	6	49	8
	10	4	30	7	50	8
	11	7	31	9	51	7
	12	5	32	2	52	6
	13	3	33	6	53	7
	14	6	34	6	54	6
	15	6	35	5	55	8
	16	6	36	8	56	8
	17	3	37	6	57	6
	18	3	38	8	58	6
	19	5	39	7	59	7
	20	1	40	2	60	4
	2					
	1	2	21	6	41	8
	2	8	22	7	42	9
	3	7	23	7	43	8
	4	5	24	7	44	6
	5	8	25	6	45	9
	6	4	26	6	46	2
	7	7	27	3	47	6
	8	6	28	8	48	8
	9	7	29	2	49	8
	10	6	30	7	50	8
	11	3	31	7	51	8
	12	2	32	2	52	8
	13	5	33	5	53	3
	14	2	34	7	54	6
	15	2	35	5	55	6
	16	6	36	8	56	5
	17	3	37	6	57	2
	18	9	38	6	58	2
	19	2	39	6	59	9
	20	3	40	7	60	6

Appendix XLVI (iv) continued/2

3

1	7	21	3	41	9
2	2	22	7	42	9
3	7	23	2	43	6
4	7	24	6	44	3
5	3	25	5	45	7
6	2	26	5	46	2
7	5	27	3	47	2
8	5	28	7	48	4
9	7	29	4	49	8
10	8	30	7	50	9
11	1	31	3	51	6
12	7	32	3	52	8
13	3	33	5	53	3
14	1	34	2	54	3
15	3	35	6	55	3
16	3	36	5	56	3
17	4	37	2	57	2
18	7	38	3	58	2
19	2	39	5	59	9
20	3	40	3	60	6

4

1	6	21	2	41	9
2	2	22	7	42	9
3	4	23	5	43	6
4	4	24	5	44	2
5	2	25	8	45	6
6	3	26	7	46	3
7	1	27	2	47	8
8	7	28	5	48	4
9	4	29	7	49	8
10	2	30	2	50	8
11	2	31	6	51	7
12	4	32	6	52	8
13	3	33	2	53	6
14	3	34	3	54	7
15	4	35	8	55	7
16	3	36	3	56	1
17	4	37	6	57	2
18	3	38	4	58	6
19	2	39	6	59	7
20	2	40	1	60	7

Appendix XLVI(iv) continued/3

5

1	5	21	6	41	7
2	7	22	8	42	8
3	7	23	2	43	7
4	5	24	7	44	3
5	7	25	4	45	9
6	6	26	7	46	5
7	6	27	4	47	8
8	6	28	7	48	7
9	7	29	6	49	8
10	4	30	10	50	9
11	4	31	8	51	9
12	4	32	4	52	9
13	4	33	5	53	6
14	4	34	4	54	8
15	4	35	7	55	5
16	6	36	7	56	4
17	6	37	4	57	5
18	4	38	7	58	0
19	5	39	1	59	8
20	4	40	1	60	6

2

1

1	7	21	3	41	9
2	7	22	7	42	9
3	7	23	3	43	7
4	6	24	2	44	6
5	7	25	6	45	8
6	7	26	6	46	5
7	7	27	2	47	6
8	5	28	7	48	6
9	8	29	2	49	8
10	5	30	6	50	8
11	4	31	7	51	8
12	4	32	2	52	5
13	3	33	4	53	7
14	1	34	5	54	4
15	4	35	3	55	1
16	2	36	4	56	7
17	3	37	6	57	5
18	5	38	7	58	5
19	4	39	5	59	6
20	1	40	3	60	8,

Appendix XLVI(iv) continued/4

2

1	6	21	6	41	8
2	7	22	7	42	7
3	7	23	6	43	7
4	5	24	5	44	7
5	5	25	6	45	8
6	5	26	7	46	2
7	5	27	5	47	6
8	6	28	7	48	4
9	5	29	7	49	7
10	7	30	6	50	7
11	4	31	7	51	7
12	2	32	8	52	8
13	6	33	7	53	5
14	6	34	7	54	6
15	2	35	6	55	2
16	5	36	7	56	6
17	8	37	5	57	4
18	4	38	5	58	4
19	6	39	7	59	8
20	1	40	3	60	7

3

1	8	21	2	41	8
2	7	22	7	42	8
3	7	23	5	43	8
4	6	24	1	44	8
5	2	25	6	45	7
6	6	26	5	46	1
7	8	27	0	47	5
8	5	28	8	48	6
9	5	29	4	49	5
10	6	30	7	50	7
11	1	31	5	51	7
12	2	32	3	52	8
13	1	33	6	53	5
14	3	34	5	54	5
15	6	35	4	55	1
16	7	36	8	56	0
17	4	37	2	57	2
18	4	38	4	58	2
19	0	39	6	59	8
20	1	40	1	60	6

Appendix XLVI (iv) continued/5

4

1	4	21	6	41	9
2	2	22	6	42	8
3	4	23	1	43	8
4	5	24	6	44	4
5	1	25	9	45	9
6	7	26	4	46	7
7	7	27	3	47	5
8	1	28	8	48	5
9	8	29	8	49	8
10	6	30	1	50	9
11	2	31	8	51	7
12	1	32	4	52	9
13	3	33	6	53	7
14	4	34	2	54	7
15	1	35	5	55	1
16	4	36	2	56	2
17	5	37	6	57	2
18	7	38	2	58	2
19	3	39	2	59	7
20	1	40	2	60	6

5

1	8	21	4	41	9
2	5	22	7	42	6
3	9	23	8	43	6
4	5	24	5	44	6
5	7	25	6	45	8
6	5	26	1	46	3
7	8	27	5	47	6
8	6	28	7	48	6
9	5	29	6	49	8
10	8	30	8	50	9
11	1	31	9	51	8
12	1	32	4	52	8
13	5	33	2	53	5
14	4	34	2	54	5
15	5	35	1	55	2
16	7	36	6	56	0
17	8	37	4	57	2
18	6	38	5	58	2
19	1	39	6	59	6
20	4	40	5	60	8

Appendix XLVI(iv) continued /6

3

1

1	4	21	4	41	6
2	6	22	3	42	5
3	3	23	0	43	7
4	5	24	1	44	4
5	4	25	3	45	7
6	1	26	1	46	1
7	1	27	1	47	2
8	1	28	2	48	4
9	1	29	0	49	8
10	2	30	1	50	7
11	1	31	5	51	8
12	2	32	3	52	0
13	5	33	2	53	6
14	0	34	1	54	2
15	4	35	1	55	1
16	1	36	4	56	6
17	3	37	3	57	6
18	2	38	0	58	6
19	0	39	6	59	6
20	1	40	4	60	1

2

1	3	21	7	41	7
2	5	22	4	42	5
3	5	23	0	43	6
4	2	24	3	44	4
5	4	25	4	45	8
6	4	26	4	46	1
7	4	27	2	47	5
8	6	28	5	48	3
9	2	29	6	49	7
10	4	30	5	50	8
11	4	31	5	51	6
12	4	32	1	52	4
13	5	33	2	53	3
14	0	34	6	54	5
15	1	35	2	55	3
16	2	36	5	56	6
17	4	37	3	57	4
18	2	38	5	58	6
19	0	39	6	59	4
20	1	40	1	60	4

3

1	4	21	1	41	6
2	4	22	4	42	5
3	2	23	5	43	8
4	4	24	1	44	5
5	2	25	4	45	4
6	6	26	5	46	4
7	6	27	0	47	4
8	4	28	5	48	4
9	4	29	4	49	7
10	4	30	6	50	7
11	1	31	5	51	5
12	2	32	3	52	5
13	4	33	2	53	4
14	3	34	2	54	4
15	1	35	4	55	1
16	1	36	6	56	5
17	1	37	1	57	2
18	8	38	1	58	1
19	0	39	5	59	4
20	0	40	3	60	8

4

1	2	21	5	41	8
2	4	22	7	42	7
3	4	23	1	43	1
4	4	24	2	44	6
5	2	25	6	45	4
6	4	26	2	46	3
7	1	27	1	47	6
8	4	28	8	48	8
9	4	29	5	49	7
10	2	30	3	50	8
11	1	31	4	51	2
12	1	32	4	52	3
13	1	33	4	53	2
14	4	34	1	54	4
15	4	35	4	55	3
16	3	36	2	56	1
17	1	37	4	57	2
18	4	38	1	58	2
19	0	39	6	59	2
20	1	40	1	60	2

Appendix XLVI (iv) continued/8

5

1	5	21	2	41	9
2	7	22	5	42	5
3	5	23	5	43	6
4	4	24	1	44	4
5	6	25	6	45	6
6	6	26	1	46	5
7	2	27	1	47	4
8	6	28	4	48	6
9	5	29	4	49	5
10	4	30	5	50	7
11	1	31	4	51	5
12	1	32	4	52	4
13	4	33	1	53	5
14	4	34	5	54	4
15	4	35	3	55	4
16	4	36	4	56	8
17	1	37	1	57	0
18	4	38	4	58	6
19	0	39	5	59	4
20	1	40	3	60	6

MEANS

FACTOR A

Level	1	Mean =	4.083
Level	2	Mean =	4.483
Level	3	Mean =	5.613

FACTOR B (REPEATED MEASURES)

Level	1	Mean =	5.353
Level	2	Mean =	5.190
Level	3	Mean =	3.637

FACTOR C (REPEATED MEASURES)

Level	1	Mean =	4.783
Level	2	Mean =	5.139
Level	3	Mean =	4.350
Level	4	Mean =	4.294
Level	5	Mean =	5.067

MEANS FOR INTERACTIONS

TWO-WAY

AB.

a 1 b 1	Mean =	4.580
a 1 b 2	Mean =	4.720
a 1 b 3	Mean =	2.950
a 2 b 1	Mean =	5.230
a 2 b 2	Mean =	4.950
a 2 b 3	Mean =	3.270
a 3 b 1	Mean =	6.250
a 3 b 2	Mean =	5.900
a 3 b 3	Mean =	4.690

AC:

a 1 c 1	Mean =	4.133
a 1 c 2	Mean =	4.350
a 1 c 3	Mean =	3.950
a 1 c 4	Mean =	3.200
a 1 c 5	Mean =	4.783
a 2 c 1	Mean =	4.167
a 2 c 2	Mean =	5.300
a 2 c 3	Mean =	4.033
a 2 c 4	Mean =	4.283
a 2 c 5	Mean =	4.633
a 3 c 1	Mean =	6.050
a 3 c 2	Mean =	5.767
a 3 c 3	Mean =	5.067
a 3 c 4	Mean =	5.400
a 3 c 5	Mean =	5.783

BC:

b 1 c 1	Mean =	6.017
b 1 c 2	Mean =	5.700
b 1 c 3	Mean =	4.617
b 1 c 4	Mean =	4.683
b 1 c 5	Mean =	5.750
b 2 c 1	Mean =	5.250
b 2 c 2	Mean =	5.767
b 2 c 3	Mean =	4.750
b 2 c 4	Mean =	4.817
b 2 c 5	Mean =	5.367
b 3 c 1	Mean =	3.083
b 3 c 2	Mean =	3.950
b 3 c 3	Mean =	3.683
b 3 c 4	Mean =	3.383
b 3 c 5	Mean =	4.083

THREE-WAY

ABC

a 1 b 1 c 1	Mean =	5.200
a 1 b 1 c 2	Mean =	4.850
a 1 b 1 c 3	Mean =	4.350
a 1 b 1 c 4	Mean =	3.250
a 1 b 1 c 5	Mean =	5.250
a 1 b 2 c 1	Mean =	4.850
a 1 b 2 c 2	Mean =	5.100
a 1 b 2 c 3	Mean =	4.450
a 1 b 2 c 4	Mean =	3.800
a 1 b 2 c 5	Mean =	5.400
a 1 b 3 c 1	Mean =	2.350
a 1 b 3 c 2	Mean =	3.100
a 1 b 3 c 3	Mean =	3.050
a 1 b 3 c 4	Mean =	2.550
a 1 b 3 c 5	Mean =	3.700
a 2 b 1 c 1	Mean =	5.750
a 2 b 1 c 2	Mean =	5.900
a 2 b 1 c 3	Mean =	4.300
a 2 b 1 c 4	Mean =	4.750
a 2 b 1 c 5	Mean =	5.450
a 2 b 2 c 1	Mean =	4.500
a 2 b 2 c 2	Mean =	6.200
a 2 b 2 c 3	Mean =	4.450
a 2 b 2 c 4	Mean =	4.550
a 2 b 2 c 5	Mean =	5.050
a 2 b 3 c 1	Mean =	2.250
a 2 b 3 c 2	Mean =	3.800
a 2 b 3 c 3	Mean =	3.350
a 2 b 3 c 4	Mean =	3.550
a 2 b 3 c 5	Mean =	3.400
a 3 b 1 c 1	Mean =	7.100
a 3 b 1 c 2	Mean =	6.350
a 3 b 1 c 3	Mean =	5.200
a 3 b 1 c 4	Mean =	6.050
a 3 b 1 c 5	Mean =	6.550
a 3 b 2 c 1	Mean =	6.400
a 3 b 2 c 2	Mean =	6.000
a 3 b 2 c 3	Mean =	5.350
a 3 b 2 c 4	Mean =	6.100
a 3 b 2 c 5	Mean =	5.650
a 3 b 3 c 1	Mean =	4.650
a 3 b 3 c 2	Mean =	4 950
a 3 b 3 c 3	Mean =	4.650
a 3 b 3 c 4	Mean =	4.050
a 3 b 3 c 5	Mean =	5.150

Appendix XLVI(v) Unit 2, The Iron Age

Three-way analysis of variance, one between groups, and two within groups (question type and type of evidence).

DESIGN 11A - THREE WAY ANOVA - MIXED: 1B 2W

DATA

	A					
	1		2		3	
C						
	S		S		S	
B						
1						
	1					
	1	5	21	7	41	7
	2	8	22	7	42	9
	3	6	23	7	43	8
	4	3	24	7	44	8
	5	6	25	8	45	8
	6	2	26	8	46	5
	7	4	27	7	47	8
	8	7	28	3	48	8
	9	4	29	8	49	8
	10	7	30	8	50	8
	11	1	31	8	51	9
	12	6	32	7	52	8
	13	2	33	8	53	2
	14	2	34	7	54	7
	15	5	35	8	55	1
	16	4	36	9	56	7
	17	2	37	3	57	3
	18	4	38	3	58	7
	19	4	39	8	59	9
	20	4	40	3	60	7
	2					
	1	5	21	8	41	7
	2	6	22	7	42	9
	3	7	23	9	43	8
	4	2	24	5	44	4
	5	5	25	7	45	7
	6	7	26	7	46	4
	7	6	27	4	47	8
	8	5	28	7	48	8
	9	4	29	8	49	8
	10	2	30	6	50	8
	11	4	31	9	51	8
	12	1	32	7	52	8
	13	3	33	6	53	1
	14	4	34	6	54	6
	15	3	35	8	55	1
	16	4	36	9	56	7
	17	2	37	5	57	4
	18	6	38	4	58	6
	19	4	39	8	59	7
	20	4	40	3	60	8

3

1	5	21	4	41	8
2	2	22	7	42	5
3	4	23	8	43	7
4	5	24	3	44	5
5	3	25	6	45	8
6	6	26	6	46	1
7	4	27	7	47	6
8	2	28	8	48	4
9	3	29	0	49	4
10	3	30	7	50	8
11	1	31	6	51	4
12	3	32	6	52	5
13	4	33	7	53	1
14	0	34	4	54	3
15	3	35	5	55	1
16	3	36	8	56	5
17	3	37	6	57	5
18	4	38	6	58	5
19	3	39	7	59	5
20	3	40	2	60	6

2

1

1	5	21	6	41	9
2	5	22	8	42	9
3	8	23	8	43	7
4	4	24	6	44	6
5	8	25	8	45	7
6	7	26	4	46	2
7	5	27	7	47	8
8	7	28	7	48	8
9	4	29	8	49	8
10	2	30	7	50	8
11	3	31	6	51	8
12	5	32	5	52	8
13	5	33	5	53	3
14	0	34	9	54	8
15	7	35	7	55	6
16	5	36	7	56	6
17	6	37	6	57	4
18	4	38	5	58	5
19	2	39	9	59	7
20	3	40	5	60	7

2

1	7	21	7	41	8
2	5	22	6	42	9
3	5	23	7	43	8
4	7	24	7	44	7
5	7	25	6	45	8
6	7	26	7	46	4
7	4	27	7	47	7
8	7	28	6	48	7
9	7	29	4	49	8
10	2	30	9	50	8
11	2	31	8	51	8
12	6	32	2	52	8
13	6	33	7	53	6
14	6	34	8	54	7
15	5	35	5	55	8
16	6	36	7	56	7
17	6	37	4	57	3
18	7	38	5	58	4
19	4	39	8	59	0
20	0	40	5	60	7

3

1	4	21	2	41	8
2	6	22	6	42	5
3	5	23	8	43	5
4	4	24	7	44	6
5	6	25	6	45	7
6	6	26	6	46	2
7	4	27	5	47	6
8	4	28	8	48	6
9	4	29	6	49	6
10	1	30	6	50	5
11	5	31	5	51	4
12	5	32	6	52	5
13	3	33	2	53	4
14	3	34	6	54	4
15	3	35	6	55	4
16	3	36	6	56	0
17	1	37	6	57	4
18	1	38	6	58	2
19	0	39	6	59	4
20	0	40	5	60	6

Appendix XLVI(v) continued/4

3

1

1	5	21	7	41	8
2	7	22	7	42	8
3	7	23	8	43	8
4	5	24	5	44	3
5	7	25	3	45	9
6	7	26	7	46	3
7	6	27	6	47	8
8	5	28	7	48	7
9	5	29	6	49	10
10	1	30	6	50	10
11	2	31	4	51	6
12	1	32	3	52	8
13	5	33	7	53	5
14	3	34	7	54	9
15	3	35	5	55	4
16	1	36	2	56	7
17	7	37	3	57	4
18	7	38	6	58	7
19	3	39	9	59	6
20	1	40	3	60	7

2

1	4	21	8	41	8
2	7	22	7	42	8
3	8	23	5	43	9
4	5	24	7	44	4
5	5	25	6	45	8
6	4	26	5	46	5
7	4	27	4	47	9
8	4	28	8	48	7
9	5	29	5	49	8
10	6	30	8	50	8
11	3	31	7	51	2
12	6	32	2	52	6
13	6	33	6	53	5
14	5	34	7	54	6
15	6	35	6	55	8
16	6	36	5	56	6
17	6	37	4	57	2
18	3	38	8	58	6
19	0	39	8	59	5
20	0	40	2	60	6

3

1	4	21	7	41	6
2	2	22	7	42	8
3	5	23	5	43	7
4	6	24	4	44	2
5	5	25	2	45	6
6	5	26	7	46	4
7	4	27	0	47	2
8	5	28	0	48	7
9	2	29	2	49	6
10	1	30	6	50	7
11	2	31	6	51	4
12	6	32	6	52	5
13	4	33	8	53	5
14	3	34	6	54	8
15	4	35	5	55	2
16	1	36	9	56	5
17	6	37	4	57	4
18	3	38	6	58	5
19	0	39	8	59	6
20	0	40	3	60	5

4

1

1	8	21	7	41	9
2	1	22	5	42	9
3	4	23	2	43	8
4	7	24	3	44	8
5	7	25	7	45	7
6	7	26	7	46	6
7	6	27	3	47	8
8	7	28	3	48	6
9	5	29	3	49	9
10	1	30	3	50	8
11	1	31	9	51	5
12	4	32	7	52	3
13	6	33	7	53	3
14	5	34	3	54	8
15	2	35	8	55	8
16	3	36	7	56	6
17	1	37	3	57	0
18	8	38	5	58	2
19	3	39	9	59	8
20	0	40	6	60	8

2

1	7	21	7	41	8
2	2	22	6	42	9
3	5	23	6	43	9
4	4	24	5	44	6
5	2	25	7	45	7
6	5	26	8	46	4
7	7	27	8	47	6
8	8	28	6	48	8
9	7	29	5	49	6
10	7	30	6	50	9
11	5	31	8	51	8
12	5	32	8	52	0
13	4	33	7	53	5
14	5	34	5	54	6
15	2	35	6	55	2
16	5	36	5	56	0
17	7	37	6	57	2
18	4	38	6	58	0
19	4	39	7	59	6
20	0	40	6	60	5

3

1	2	21	7	41	9
2	6	22	5	42	6
3	3	23	6	43	0
4	4	24	7	44	6
5	2	25	6	45	4
6	2	26	7	46	4
7	1	27	3	47	4
8	2	28	6	48	8
9	6	29	4	49	7
10	4	30	6	50	7
11	2	31	6	51	4
12	6	32	7	52	4
13	1	33	6	53	2
14	0	34	4	54	5
15	2	35	6	55	6
16	1	36	6	56	0
17	6	37	1	57	4
18	6	38	5	58	0
19	1	39	6	59	4
20	0	40	1	60	7

Appendix XLVI(v) continued/7

5

1

1	7	21	3	41	8
2	4	22	9	42	8
3	5	23	6	43	8
4	7	24	9	44	7
5	3	25	7	45	8
6	4	26	5	46	3
7	6	27	0	47	5
8	8	28	7	48	9
9	5	29	7	49	9
10	6	30	3	50	9
11	3	31	9	51	8
12	4	32	8	52	8
13	3	33	7	53	8
14	4	34	8	54	7
15	3	35	7	55	6
16	6	36	6	56	7
17	7	37	8	57	1
18	6	38	7	58	4
19	3	39	9	59	7
20	5	40	6	60	8

2

1	7	21	7	41	7
2	6	22	9	42	8
3	5	23	6	43	9
4	5	24	8	44	2
5	8	25	8	45	7
6	2	26	5	46	3
7	6	27	0	47	6
8	5	28	7	48	6
9	5	29	6	49	7
10	2	30	8	50	8
11	4	31	7	51	8
12	6	32	8	52	8
13	4	33	7	53	4
14	4	34	7	54	8
15	4	35	5	55	7
16	3	36	6	56	7
17	6	37	6	57	2
18	8	38	3	58	4
19	5	39	6	59	5
20	5	40	4	60	6

3

1	1	21	4	41	9
2	5	22	6	42	8
3	3	23	4	43	8
4	4	24	2	44	6
5	4	25	6	45	6
6	5	26	2	46	4
7	4	27	5	47	5
8	4	28	5	48	8
9	5	29	5	49	4
10	4	30	8	50	9
11	5	31	7	51	1
12	6	32	5	52	4
13	0	33	4	53	4
14	0	34	7	54	5
15	5	35	2	55	1
16	2	36	4	56	2
17	5	37	5	57	1
18	0	38	4	58	4
19	4	39	7	59	4
20	3	40	4	60	6

Appendix XLVI(v) continued/9

MEANS

FACTOR A

Level	1	Mean =	4.193
Level	2	Mean =	5.900
Level	3	Mean =	5.897

FACTOR B (REPEATED MEASURES)

Level	1	Mean =	5.400
Level	2	Mean =	5.556
Level	3	Mean =	5.256
Level	4	Mean =	5.022
Level	5	Mean =	5.417

FACTOR C (REPEATED MEASURES)

Level	1	Mean =	5.817
Level	2	Mean =	5.720
Level	3	Mean =	4.453

MEANS FOR INTERACTIONS

TWO-WAY

AB:

a 1 b 1	Mean	3.900
a 1 b 2	Mean =	4.483
a 1 b 3	Mean =	4.150
a 1 b 4	Mean =	3.967
a 1 b 5	Mean =	4.467
a 2 b 1	Mean =	6.300
a 2 b 2	Mean =	6.200
a 2 b 3	Mean =	5.500
a 2 b 4	Mean =	5.667
a 2 b 5	Mean =	5.833
a 3 b 1	Mean =	6.000
a 3 b 2	Mean =	5.983
a 3 b 3	Mean =	6.117
a 3 b 4	Mean =	5.433
a 3 b 5	Mean =	5.950

Appendix XLVI(v) continued/10

AC:

a 1 c 1	Mean =	4.540
a 1 c 2	Mean =	4.780
a 1 c 3	Mean =	3.260
a 2 c 1	Mean =	6.160
a 2 c 2	Mean =	6.250
a 2 c 3	Mean	5.290
a 3 c 1	Mean =	6.750
a 3 c 2	Mean -	6.130
a 3 c 3	Mean =	4.810

BC:

b 1 c 1	Mean =	5.950
b 1 c 2	Mean =	5.700
b 1 c 3	Mean =	4.550
b 2 c 1	Mean =	6.033
b 2 c 2	Mean =	6.050
b 2 c 3	Mean =	4.583
b 3 c 1	Mean =	5.600
b 3 c 2	Mean -	5.617
b 3 c 3	Mean =	4.550
b 4 c 1	Mean =	5.367
b 4 c 2	Mean -	5.483
b 4 c 3	Mean =	4.217
b 5 c 1	Mean =	6.133
b 5 c 2	Mean =	5.750
b 5 c 3	Mean =	4.367

THREE-WAY

ABC:

a 1	b 1	c 1	Mean =	4.300
a 1	b 1	c 2	Mean =	4.200
a 1	b 1	c 3	Mean	3.200
a 1	b 2	c 1	Mean =	4.750
a 1	b 2	c 2	Mean =	5.300
a 1	b 2	c 3	Mean =	3.400
a 1	b 3	c 1	Mean =	4.400
a 1	b 3	c 2	Mean =	4.650
a 1	b 3	c 3	Mean =	3.400
a 1	b 4	c 1	Mean =	4.300
a 1	b 4	c 2	Mean =	4.750
a 1	b 4	c 3	Mean =	2.850
a 1	b 5	c 1	Mean =	4.950
a 1	b 5	c 2	Mean =	5.000
a 1	b 5	c 3	Mean =	3.450
a 2	b 1	c 1	Mean =	6.700
a 2	b 1	c 2	Mean =	6.550
a 2	b 1	c 3	Mean =	5.650
a 2	b 2	c 1	Mean =	6.650
a 2	b 2	c 2	Mean =	6.250
a 2	b 2	c 3	Mean =	5.700
a 2	b 3	c 1	Mean =	5.550
a 2	b 3	c 2	Mean =	5.900
a 2	b 3	c 3	Mean =	5.050
a 2	b 4	c 1	Mean =	5.350
a 2	b 4	c 2	Mean =	6.400
a 2	b 4	c 3	Mean =	5.250
a 2	b 5	c 1	Mean =	6.550
a 2	b 5	c 2	Mean =	6.150
a 2	b 5	c 3	Mean =	4.800
a 3	b 1	c 1	Mean =	6.850
a 3	b 1	c 2	Mean =	6.350
a 3	b 1	c 3	Mean =	4.800
a 3	b 2	c 1	Mean =	6.700
a 3	b 2	c 2	Mean =	6.600
a 3	b 2	c 3	Mean =	4.650
a 3	b 3	c 1	Mean =	6.850
a 3	b 3	c 2	Mean =	6.300
a 3	b 3	c 3	Mean =	5.200
a 3	b 4	c 1	Mean =	6.450
a 3	b 4	c 2	Mean =	5.300
a 3	b 4	c 3	Mean =	4.550
a 3	b 5	c 1	Mean =	6.900
a 3	b 5	c 2	Mean =	6.100
a 3	b 5	c 3	Mean =	4.850

Appendix XLVI(vi) Unit 3. The Saxons.

Three way analysis of variance one between groups and two within groups (question type and type of evidence)

DESIGN 11A - THREE WAY ANOVA - MIXED: 1B 2W

DATA

	A 1		A 2		A 3	
C	S		S		S	
B						
1						
1						
1	4	21	7	41	6	
2	5	22	9	42	8	
3	4	23	6	43	7	
4	2	24	8	44	7	
5	8	25	9	45	9	
6	2	26	5	46	4	
7	7	27	6	47	7	
8	7	28	8	48	9	
9	3	29	4	49	6	
10	2	30	6	50	9	
11	1	31	10	51	8	
12	4	32	7	52	7	
13	4	33	6	53	7	
14	4	34	9	54	8	
15	4	35	6	55	8	
16	2	36	9	56	6	
17	4	37	5	57	5	
18	4	38	7	58	5	
19	4	39	9	59	9	
20	3	40	3	60	9	
2						
1	4	21	8	41	9	
2	7	22	9	42	9	
3	7	23	7	43	7	
4	6	24	7	44	6	
5	2	25	7	45	8	
6	6	26	6	46	7	
7	4	27	4	47	7	
8	5	28	8	48	7	
9	3	29	8	49	8	
10	7	30	9	50	10	
11	6	31	9	51	8	
12	5	32	7	52	8	
13	6	33	7	53	8	
14	7	34	8	54	8	
15	7	35	5	55	7	
16	7	36	8	56	7	
17	4	37	5	57	6	
18	5	38	8	58	9	
19	4	39	9	59	8	
20	0	40	4	60	7	

Appendix XLVI(vi) continued/2

3

1	6	21	8	41	8
2	9	22	8	42	8
3	8	23	7	43	7
4	6	24	9	44	5
5	6	25	8	45	9
6	5	26	4	46	3
7	9	27	4	47	5
8	6	28	8	48	8
9	3	29	7	49	9
10	2	30	7	50	9
11	4	31	7	51	9
12	3	32	7	52	7
13	5	33	7	53	5
14	7	34	7	54	7
15	4	35	8	55	8
16	0	36	7	56	4
17	7	37	7	57	3
18	2	38	5	58	5
19	7	39	8	59	8
20	6	40	4	60	7

4

1	8	21	8	41	9
2	3	22	8	42	9
3	7	23	7	43	2
4	7	24	9	44	2
5	8	25	8	45	9
6	7	26	7	46	5
7	5	27	5	47	9
8	7	28	9	48	7
9	5	29	7	49	10
10	7	30	7	50	7
11	3	31	8	51	7
12	7	32	7	52	7
13	7	33	9	53	6
14	7	34	8	54	8
15	5	35	5	55	2
16	6	36	7	56	4
17	7	37	6	57	4
18	6	38	7	58	7
19	3	39	7	59	9
20	1	40	3	60	8

Appendix XLVI(vi) continued/3

5

1	6	21	4	41	6
2	5	22	9	42	9
3	7	23	7	43	8
4	5	24	7	44	8
5	7	25	7	45	9
6	7	26	7	46	3
7	7	27	5	47	8
8	8	28	7	48	8
9	7	29	8	49	8
10	5	30	8	50	8
11	7	31	9	51	8
12	5	32	4	52	7
13	4	33	2	53	8
14	4	34	3	54	9
15	5	35	5	55	2
16	6	36	6	56	8
17	6	37	5	57	2
18	7	38	7	58	3
19	5	39	0	59	8
20	3	40	1	60	9

2

1

1	8	21	8	41	6
2	7	22	9	42	8
3	9	23	8	43	8
4	8	24	5	44	7
5	8	25	8	45	7
6	8	26	5	46	5
7	7	27	8	47	8
8	6	28	6	48	8
9	6	29	2	49	7
10	5	30	9	50	8
11	2	31	8	51	8
12	6	32	7	52	7
13	7	33	5	53	6
14	4	34	8	54	7
15	7	35	8	55	8
16	6	36	7	56	0
17	6	37	6	57	4
18	6	38	9	58	5
19	6	39	8	59	6
20	6	40	4	60	8

Appendix XLVI(vi) continued/4

2

1	7	21	6	41	9
2	8	22	9	42	8
3	8	23	7	43	6
4	5	24	8	44	8
5	8	25	7	45	7
6	5	26	7	46	7
7	5	27	8	47	7
8	4	28	8	48	9
9	7	29	7	49	8
10	8	30	9	50	8
11	6	31	9	51	7
12	6	32	8	52	7
13	4	33	6	53	6
14	6	34	8	54	4
15	6	35	8	55	6
16	7	36	8	56	4
17	6	37	7	57	7
18	6	38	8	58	6
19	3	39	7	59	7
20	0	40	0	60	7

3

1	8	21	9	41	8
2	6	22	7	42	8
3	8	23	8	43	8
4	5	24	8	44	8
5	8	25	6	45	8
6	6	26	7	46	3
7	8	27	7	47	6
8	4	28	8	48	9
9	8	29	6	49	9
10	6	30	7	50	9
11	2	31	8	51	6
12	3	32	8	52	7
13	7	33	7	53	7
14	4	34	8	54	7
15	6	35	8	55	7
16	0	36	5	56	5
17	7	37	7	57	3
18	6	38	6	58	4
19	7	39	7	59	7
20	4	40	4	60	7

Appendix XLVI(vi) continued/5

4

1	8	21	7	41	9
2	6	22	9	42	8
3	7	23	7	43	7
4	7	24	8	44	7
5	7	25	7	45	9
6	7	26	7	46	7
7	7	27	5	47	4
8	7	28	7	48	9
9	6	29	6	49	9
10	4	30	9	50	8
11	2	31	8	51	6
12	5	32	5	52	7
13	3	33	2	53	5
14	6	34	7	54	7
15	7	35	7	55	6
16	5	36	5	56	0
17	2	37	7	57	10
18	6	38	8	58	7
19	6	39	7	59	7
20	0	40	2	60	8

5

1	6	21	4	41	6
2	7	22	8	42	8
3	7	23	6	43	7
4	8	24	7	44	8
5	7	25	7	45	8
6	7	26	8	46	5
7	7	27	4	47	7
8	6	28	5	48	9
9	5	29	7	49	5
10	8	30	7	50	8
11	6	31	8	51	8
12	9	32	7	52	6
13	5	33	6	53	7
14	6	34	8	54	8
15	4	35	8	55	2
16	6	36	6	56	4
17	5	37	4	57	0
18	7	38	4	58	6
19	8	39	9	59	8
20	3	40	2	60	8

Appendix XLVI(vi) continued/6

3

1

1	6	21	6	41	8
2	2	22	6	42	9
3	5	23	8	43	6
4	5	24	8	44	2
5	5	25	6	45	6
6	8	26	7	46	6
7	5	27	6	47	7
8	6	28	6	48	9
9	6	29	2	49	5
10	5	30	9	50	8
11	6	31	7	51	5
12	1	32	8	52	5
13	6	33	6	53	5
14	5	34	6	54	5
15	4	35	7	55	6
16	4	36	5	56	0
17	6	37	5	57	2
18	5	38	5	58	0
19	4	39	6	59	6
20	5	40	0	60	7

2

1	6	21	7	41	7
2	4	22	6	42	6
3	5	23	7	43	7
4	5	24	8	44	7
5	5	25	7	45	7
6	6	26	7	46	7
7	7	27	4	47	4
8	6	28	7	48	8
9	0	29	6	49	5
10	5	30	9	50	7
11	6	31	7	51	7
12	4	32	6	52	6
13	5	33	4	53	7
14	0	34	6	54	2
15	5	35	7	55	0
16	5	36	5	56	6
17	6	37	6	57	4
18	4	38	9	58	5
19	0	39	5	59	4
20	0	40	0	60	5

Appendix XLVII(vi) continued/7

3

1	5	21	7	41	9
2	7	22	7	42	8
3	6	23	7	43	7
4	6	24	5	44	6
5	6	25	7	45	7
6	4	26	7	46	4
7	7	27	5	47	7
8	4	28	5	48	4
9	2	29	5	49	7
10	5	30	8	50	8
11	5	31	6	51	7
12	2	32	4	52	6
13	5	33	6	53	7
14	4	34	6	54	7
15	4	35	6	55	5
16	0	36	5	56	3
17	5	37	6	57	0
18	5	38	4	58	5
19	0	39	5	59	4
20	0	40	0	60	6

4

1	7	21	4	41	9
2	5	22	6	42	7
3	7	23	2	43	6
4	5	24	5	44	6
5	9	25	6	45	8
6	5	26	6	46	6
7	2	27	5	47	7
8	5	28	4	48	8
9	2	29	3	49	9
10	8	30	8	50	9
11	2	31	8	51	6
12	7	32	6	52	6
13	2	33	2	53	7
14	1	34	6	54	4
15	1	35	8	55	4
16	4	36	1	56	5
17	1	37	6	57	0
18	7	38	7	58	5
19	2	39	0	59	7
20	0	40	2	60	8

5

1	5	21	2	41	7
2	8	22	9	42	7
3	5	23	7	43	5
4	5	24	7	44	6
5	5	25	5	45	6
6	5	26	5	46	4
7	6	27	5	47	8
8	6	28	6	48	8
9	5	29	5	49	8
10	5	30	6	50	9
11	5	31	4	51	8
12	7	32	7	52	6
13	2	33	4	53	7
14	5	34	7	54	7
15	4	35	7	55	1
16	5	36	4	56	4
17	5	37	4	57	0
18	6	38	2	58	5
19	2	39	0	59	7
20	2	40	1	60	9

Appendix XLVI(vi) continued/9

MEANS

FACTOR A

Level	1	Mean =	5.177
Level	2	Mean =	6.320
Level	3	Mean =	6.530

FACTOR B (REPEATED MEASURES)

Level	1	Mean =	6.303
Level	2	Mean =	6.477
Level	3	Mean =	5.247

FACTOR C (REPEATED MEASURES)

Level	1	Mean =	6.017
Level	2	Mean =	6.194
Level	3	Mean =	5.978
Level	4	Mean =	5.950
Level	5	Mean =	5.906

MEANS FOR INTERACTIONS

TWO-WAY

AB:

a 1 b 1	Mean =	5.170
a 1 b 2	Mean =	5.910
a 1 b 3	Mean =	4.450
a 2 b 1	Mean =	6.720
a 2 b 2	Mean =	6.790
a 2 b 3	Mean =	5.450
a 3 b 1	Mean =	7.020
a 3 b 2	Mean =	6.730
a 3 b 3	Mean =	5.840

AC:

a 1 c 1	Mean =	5.083
a 1 c 2	Mean =	5.017
a 1 c 3	Mean =	5.000
a 1 c 4	Mean =	5.100
a 1 c 5	Mean =	5.683

Appendix XLVI(vi) continued/10

a 1 b 1 c 4	Mean =	5.800
a 1 b 1 c 5	Mean =	5.800
a 1 b 2 c 1	Mean =	6.400
a 1 b 2 c 2	Mean =	5.750
a 1 b 2 c 3	Mean =	5.650
a 1 b 2 c 4	Mean =	5.400
a 1 b 2 c 5	Mean =	6.350
a 1 b 3 c 1	Mean =	4.950
a 1 b 3 c 2	Mean =	4.200
a 1 b 3 c 3	Mean =	4.100
a 1 b 3 c 4	Mean =	4.100
a 1 b 3 c 5	Mean =	4.900
a 2 b 1 c 1	Mean =	6.950
a 2 b 1 c 2	Mean =	7.150
a 2 b 1 c 3	Mean =	6.850
a 2 b 1 c 4	Mean =	7.100
a 2 b 1 c 5	Mean =	5.550
a 2 b 2 c 1	Mean =	6.900
a 2 b 2 c 2	Mean =	7.250
a 2 b 2 c 3	Mean =	7.050
a 2 b 2 c 4	Mean =	6.500
a 2 b 2 c 5	Mean =	6.250
a 2 b 3 c 1	Mean =	5.950
a 2 b 3 c 2	Mean =	6.150
a 2 b 3 c 3	Mean =	5.550
a 2 b 3 c 4	Mean =	4.750
a 2 b 3 c 5	Mean =	4.850
a 3 b 1 c 1	Mean =	7.200
a 3 b 1 c 2	Mean =	7.700
a 3 b 1 c 3	Mean =	6.700
a 3 b 1 c 4	Mean =	6.550
a 3 b 1 c 5	Mean =	6.950
a 3 b 2 c 1	Mean =	6.550
a 3 b 2 c 2	Mean =	6.900
a 3 b 2 c 3	Mean =	6.800
a 3 b 2 c 4	Mean =	7.000
a 3 b 2 c 5	Mean =	6.400
a 3 b 3 c 1	Mean =	5.350
a 3 b 3 c 2	Mean =	5.550
a 3 b 3 c 3	Mean =	5.850
a 3 b 3 c 4	Mean =	6.350
a 3 b 3 c 5	Mean =	6.100

Appendix XLVI(vii)

Repeated measures design across Units 1, 2 and 4, one between groups, two within groups, (repeated measures artefact) 3 levels = 3 questions and 3 units.

DESIGN 11A - THREE WAY ANOVA - MIXED: 1B 2W

DATA

	A					
	1		2		3	
C	S		S		S	
B						
1						
1						
1	7	21	8	41	9	
2	6	22	6	42	9	
3	8	23	7	43	7	
4	6	24	6	44	6	
5	7	25	2	45	8	
6	5	26	6	46	5	
7	6	27	2	47	9	
8	2	28	6	48	8	
9	8	29	6	49	8	
10	4	30	7	50	8	
11	7	31	9	51	7	
12	5	32	2	52	6	
13	3	33	6	53	7	
14	6	34	6	54	6	
15	6	35	5	55	8	
16	6	36	8	56	8	
17	3	37	6	57	6	
18	3	38	8	58	6	
19	5	39	7	59	7	
20	1	40	2	60	4	
2						
1	7	21	3	41	9	
2	7	22	7	42	9	
3	7	23	3	43	7	
4	6	24	2	44	6	
5	7	25	6	45	8	
6	7	26	6	46	5	
7	7	27	2	47	6	
8	5	28	7	48	6	
9	8	29	2	49	8	
10	5	30	6	50	8	
11	4	31	7	51	8	
12	4	32	2	52	5	
13	3	33	4	53	7	
14	1	34	5	54	4	
15	4	35	3	55	1	
16	2	36	4	56	7	
17	3	37	6	57	5	
18	5	38	7	58	5	
19	4	39	5	59	6	
20	1	40	3	60	8	

Appendix XLVI(vii) continued/2

3

1	4	21	4	41	6
2	6	22	3	42	5
3	3	23	0	43	7
4	5	24	1	44	4
5	4	25	3	45	7
6	1	26	1	46	1
7	1	27	1	47	2
8	1	28	2	48	4
9	1	29	0	49	8
10	2	30	1	50	7
11	1	31	5	51	8
12	2	32	3	52	0
13	5	33	2	53	6
14	0	34	1	54	2
15	4	35	1	55	1
16	1	36	4	56	6
17	3	37	3	57	6
18	2	38	0	58	6
19	0	39	6	59	6
20	1	40	4	60	1

2

1

1	5	21	7	41	7
2	8	22	7	42	9
3	6	23	7	43	8
4	3	24	7	44	8
5	6	25	8	45	8
6	2	26	8	46	5
7	4	27	7	47	8
8	7	28	3	48	8
9	4	29	8	49	8
10	7	30	8	50	8
11	1	31	5	51	9
12	6	32	7	52	8
13	2	33	8	53	2
14	2	34	7	54	7
15	5	35	8	55	1
16	4	36	9	56	7
17	2	37	3	57	3
18	4	38	3	58	7
19	4	39	8	59	9
20	4	40	3	60	7

Appendix XLVI(vii) continued/3

2

1	5	21	8	41	7
2	6	22	7	42	9
3	7	23	9	43	8
4	2	24	5	44	4
5	5	25	7	45	7
6	7	26	7	46	4
7	6	27	4	47	8
8	5	28	7	48	8
9	4	29	8	49	8
10	2	30	6	50	8
11	4	31	9	51	8
12	1	32	7	52	8
13	3	33	6	53	1
14	4	34	6	54	6
15	3	35	6	55	1
16	4	36	9	56	7
17	2	37	5	57	4
18	6	38	4	58	6
19	4	39	8	59	7
20	4	40	3	60	8

3

1	5	21	4	41	8
2	2	22	7	42	5
3	4	23	8	43	7
4	5	24	3	44	5
5	3	25	6	45	8
6	6	26	6	46	1
7	4	27	7	47	6
8	2	28	8	48	4
9	3	29	0	49	4
10	3	30	7	50	8
11	1	31	6	51	4
12	3	32	6	52	5
13	4	33	7	53	1
14	0	34	4	54	3
15	3	35	5	55	1
16	3	36	8	56	5
17	3	37	6	57	5
18	4	38	6	58	5
19	3	39	7	59	5
20	3	40	2	60	6

Appendix XLVI (vii) continued/4

3

1

1	4	21	7	41	6
2	5	22	9	42	8
3	4	23	6	43	7
4	2	24	8	44	7
5	8	25	9	45	9
6	2	26	5	46	4
7	7	27	6	47	7
8	7	28	8	48	9
9	3	29	4	49	6
10	2	30	6	50	9
11	1	31	10	51	8
12	4	32	7	52	7
13	4	33	6	53	7
14	4	34	9	54	8
15	4	35	6	55	8
16	2	36	9	56	6
17	4	37	5	57	5
18	4	38	7	58	5
19	4	39	9	59	9
20	3	40	3	60	9

2

1	8	21	8	41	6
2	7	22	9	42	8
3	9	23	8	43	8
4	8	24	5	44	7
5	8	25	8	45	7
6	8	26	5	46	5
7	7	27	8	47	8
8	6	28	6	48	8
9	6	29	2	49	7
10	5	30	9	50	8
11	2	31	8	51	8
12	6	32	7	52	7
13	7	33	5	53	6
14	4	34	8	54	7
15	7	35	8	55	8
16	6	36	7	56	0
17	6	37	6	57	4
18	6	38	9	58	5
19	6	39	8	59	6
20	6	40	4	60	8

Appendix XLVI(vii) continued/5

3

1	6	21	6	41	8
2	2	22	6	42	9
3	5	23	8	43	6
4	5	24	8	44	2
5	5	25	6	45	6
6	8	26	7	46	6
7	5	27	6	47	7
8	6	28	6	48	9
9	6	29	2	49	5
10	5	30	9	50	8
11	6	31	7	51	5
12	1	32	8	52	5
13	6	33	6	53	5
14	5	34	6	54	5
15	4	35	7	55	6
16	4	36	5	56	0
17	6	37	5	57	2
18	5	38	5	58	0
19	4	39	6	59	6
20	5	40	0	60	7

Appendix XLVI(vii) continued/6

MEANS

FACTOR A

Level	1	Mean =	4.372
Level	2	Mean =	5.689
Level	3	Mean =	6.139

FACTOR B (REPEATED MEASURES)

Level	1	Mean =	4.783
Level	2	Mean =	5.400
Level	3	Mean =	6.017

FACTOR C (REPEATED MEASURES)

Level	1	Mean =	5.994
Level	2	Mean =	5.856
Level	3	Mean =	4.350

MEANS FOR INTERACTIONS

TWO-WAY

AB:

a 1 b 1	Mean =	4.133
a 1 b 2	Mean =	3.900
a 1 b 3	Mean =	5.083
a 2 b 1	Mean =	4.167
a 2 b 2	Mean =	6.300
a 2 b 3	Mean =	6.600
a 3 b 1	Mean =	6.050
a 3 b 2	Mean =	6.000
a 3 b 3	Mean =	6.367

AC:

a 1 c 1	Mean =	4.467
a 1 c 2	Mean =	5.150
a 1 c 3	Mean =	3.500
a 2 c 1	Mean =	6.467
a 2 c 2	Mean =	5.983
a 2 c 3	Mean =	4.617
a 3 c 1	Mean =	7.050
a 3 c 2	Mean =	6.433
a 3 c 3	Mean =	4.933

BC:

b 1 c 1	Mean =	6.017
b 1 c 2	Mean =	5.250
b 1 c 3	Mean =	3.083
b 2 c 1	Mean =	5.950
b 2 c 2	Mean =	5.700
b 2 c 3	Mean =	4.550
b 3 c 1	Mean =	6.017
b 3 c 2	Mean =	6.617
b 3 c 3	Mean =	5.417

THREE-WAY

ABC:

a	1	b	1	c	1	Mean =	5.200
a	1	b	1	c	2	Mean =	4.850
a	1	b	1	c	3	Mean =	2.350
a	1	b	2	c	1	Mean =	4.300
a	1	b	2	c	2	Mean =	4.200
a	1	b	2	c	3	Mean =	3.200
a	1	b	3	c	1	Mean =	3.900
a	1	b	3	c	2	Mean =	6.400
a	1	b	3	c	3	Mean =	4.950
a	2	b	1	c	1	Mean =	5.750
a	2	b	1	c	2	Mean =	4.500
a	2	b	1	c	3	Mean =	2.250
a	2	b	2	c	1	Mean =	6.700
a	2	b	2	c	2	Mean =	6.550
a	2	b	2	c	3	Mean =	5.650
a	2	b	3	c	1	Mean =	6.950
a	2	b	3	c	2	Mean =	6.900
a	2	b	3	c	3	Mean =	5.950
a	3	b	1	c	1	Mean =	7.100
a	3	b	1	c	2	Mean =	6.400
a	3	b	1	c	3	Mean =	4.650
a	3	b	2	c	1	Mean =	6.850
a	3	b	2	c	2	Mean =	6.350
a	3	b	2	c	3	Mean =	4.800
a	3	b	3	c	1	Mean =	7.200
a	3	b	3	c	2	Mean =	6.550
a	3	b	3	c	3	Mean =	5.350

EXPERIMENTAL GROUP 1. UNIT 1. THE STONE AGES. WRITTEN EVIDENCE LEVELS

NAME	NFER VR BC	NFER NVR BO	ARTEFACT TEST Qu.			PICTURE TEST Qu.			DIAGRAM TEST Qu.			MAP TEST Qu.			WRITING TEST Qu.		
			1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
J.B.	115	102	8	3	4	6	6	7	3	2	1	2	6	5	6	4	2
E.S.	112	129	6	7	3	7	7	4	7	7	4	7	6	7	8	7	5
H.G.	110	129	7	3	0	7	6	0	2	5	5	5	1	1	2	8	5
G.P.	108	133	6	2	1	7	5	3	6	1	1	5	6	2	7	5	1
C.L.	107	86	2	6	3	6	6	4	5	6	4	8	9	6	4	6	6
K.M.	102	116	6	6	1	6	7	4	5	5	5	7	4	2	7	1	1
P.K.	102	105	2	2	1	3	5	2	3	0	0	2	3	1	4	5	1
M.L.	101	102	6	7	2	8	7	5	7	8	5	5	8	8	7	7	4
H.C.	100	97	6	2	0	2	7	6	4	4	4	7	8	5	6	6	4
S.H.	99	104	7	6	1	7	6	5	7	7	6	2	1	3	10	8	5
I.W.	98	123	9	7	5	7	7	5	3	5	5	6	8	4	8	9	4
C.L.	97	122	2	2	3	2	8	1	3	3	3	6	4	4	4	4	4
R.D.	97	102	6	4	2	5	7	2	5	6	2	2	6	4	5	2	1
C.B.	96	96	6	5	1	7	7	6	2	5	2	3	2	1	4	2	5
D.S.	95	88	5	3	1	5	6	2	6	4	4	8	5	4	7	1	3
R.L.	93	107	8	4	4	8	7	5	5	8	6	3	2	2	7	6	4
J.Web	91	117	6	6	3	6	5	3	2	2	1	6	6	4	4	4	1
B.K.	91	88	8	7	0	6	5	5	3	4	1	4	2	1	7	5	4
N.H.	90	105	7	5	6	6	7	6	5	6	5	6	2	6	1	6	5
G.B.	86	86	2	3	4	7	3	1	3	1	3	1	2	1	1	5	3

EXPERIMENTAL GROUP 2. UNIT 1. THE STONE AGES. WRITTEN EVIDENCE LEVELS

NAME	NFER VR BC	NFER NVR BO	ARTEFACT Qu.			PICTURE Qu.			DIAGRAM Qu.			MAP Qu.			WRITING Qu.		
			1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
M.H.	131	135	9	9	6	8	8	7	9	8	6	9	9	8	7	9	9
M.F.	117	129	9	9	5	9	7	5	9	8	5	9	8	7	8	6	5
F.B.	116	125	7	7	7	8	7	6	6	8	8	6	8	1	7	6	6
S.K.	116	115	6	6	4	6	7	4	3	8	5	2	4	6	3	6	4
A.W.	115	128	8	8	7	9	8	8	7	7	4	6	9	4	9	8	6
L.W.	107	111	5	5	1	2	2	1	2	1	4	3	7	3	5	3	5
P.C.	107	114	9	6	2	6	6	5	2	5	4	8	5	6	8	6	4
M.S.	107	120	8	6	4	8	4	3	4	6	4	4	5	8	7	6	6
J.G.	105	120	8	8	8	8	7	7	8	5	7	8	8	7	8	8	5
D.F.	105	120	8	8	7	8	7	8	9	7	7	8	9	8	9	9	7
K.C.	102	111	7	8	8	8	7	6	6	7	5	7	7	2	9	8	5
R.L.	101	105	6	5	0	8	8	4	8	8	5	8	9	3	9	8	4
R.F.	99	105	7	7	6	3	5	3	3	5	4	6	7	2	6	5	5
N.T.	94	88	6	4	2	6	6	5	3	5	4	7	7	4	8	5	4
K.G.	92	99	8	1	1	6	2	3	3	1	1	7	1	3	5	2	4
M.H.	90	108	8	7	6	5	6	6	3	0	5	1	2	1	4	0	8
S.W.		102	6	5	6	2	4	4	2	2	2	2	2	2	5	2	0
F.F.	85	91	6	5	6	2	4	6	2	2	1	6	2	2	0	2	6
J.H.	85	100	7	6	6	9	8	4	9	8	4	7	7	2	8	6	4
J.K.		88	4	8	1	6	7	4	6	6	8	7	6	2	6	8	6

CONTROL GROUP. UNIT 1. THE STONE AGES. WRITTEN EVIDENCE LEVELS

NAME			ARTEFACT Qu.			PICTURE Qu.			DIAGRAM Qu.			MAP Qu.			WRITING Qu.		
			1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
L.M.		136	7	7	4	2	6	3	7	8	4	6	4	2	5	8	5
C.S.		136	6	7	6	8	7	5	2	7	4	2	2	4	7	5	7
C.J.		133	8	7	3	7	7	5	7	7	2	4	4	4	7	9	5
B.P.		129	6	6	5	5	5	2	7	6	4	4	5	4	5	5	4
S.J.		127	7	7	4	8	5	4	3	2	2	2	1	2	7	7	6
J.W.		122	5	7	1	4	5	4	2	6	6	3	7	4	6	5	6
L.B.		119	6	7	1	7	5	4	5	8	6	1	7	1	6	8	2
P.C.		115	2	5	1	6	6	6	5	5	4	7	1	4	6	6	6
N.C.		114	8	8	1	7	5	2	7	5	4	4	8	4	7	5	5
F.S.		113	4	5	2	6	7	4	8	6	4	2	6	2	4	8	4
J.C.		107	7	4	1	3	4	4	1	1	1	2	2	1	4	1	1
T.W.		107	5	4	2	2	2	4	7	2	2	4	1	1	4	1	1
D.H.		106	3	3	5	5	6	5	3	1	4	3	3	1	4	5	4
A.R.		106	6	1	0	2	6	0	1	3	3	3	4	4	4	4	4
D.H.		105	6	4	4	2	2	1	3	6	1	4	1	4	4	5	4
F.S.		108	6	2	1	6	5	2	3	7	1	3	4	3	6	7	4
N.L.		104	3	3	3	3	8	4	4	4	1	4	5	1	6	8	1
M.B.		95	3	5	2	9	4	2	7	4	8	3	7	4	4	6	4
G.R.		87	5	4	0	2	6	0	2	0	0	2	3	0	5	1	0
K.D.		75	1	1	1	3	1	1	3	1	0	2	1	1	4	4	1

EXPERIMENTAL GROUP 1. UNIT TWO. THE IRON AGE. WRITTEN EVIDENCE

NAME	NVR BD	ARTEFACT			PICTURE			DIAGRAM			MAP			WRITING		
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
J.B.	102	7	8	4	6	7	2	7	8	7	7	7	7	3	7	4
E.S.	129	7	7	7	8	6	6	7	7	7		a		9	9	6
H.G.	129	7	9	8	8	7	8	8	5	5	2	6	6	6	6	4
G.P.	133	7	5	3	6	7	7	5	7	4	3	5	7	9	8	2
C.L.	86	8	7	6	8	6	6	3	6	2	7	7	6	7	8	6
K.M.	116	8	7	6	4	7	6	7	5	7	7	8	7	5	5	2
P.K.	105	7	4	7	7	7	5	6	4	0	3	8	3	0	0	5
M.L.	102	3	7	8	7	6	8	7	8	0	3	6	6	7	7	5
H.C.	97	8	8	0	8	4	6	6	5	2	3	5	4		a	
S.H.	104	8	6	7	7	9	6	6	8	6	3	6	6	3	8	8
I.W.	123	8	9	6	6	8	5	4	7	6	9	8	6	9	7	7
C.L.	122	7	7	6	5	2	6	3	2	6	7	8	7	8	8	5
R.D.	102	8	6	7	5	7	2	7	6	8	7	7	6	7	7	4
C.B.	96	7	6	4	9	8	6	7	7	6	3	5	4	8	7	7
D.S.	88	8	6	5	7	5	6	5	6	5	8	6	6	7	5	2
R.L.	107	9	9	8	7	7	6	2	5	9	7	5	6	6	6	4
J.W.	117	3	5	6	6	4	6	3	4	4	3	6	1	8	6	5
B.K.	88	3	4	6	5	5	6	6	8	6		a		7	3	4
N.H.	105	8	8	7	9	8	6	9	8	8	9	7	6	9	6	7
G.B.	86	3	3	2	5	5	5	3	2	3	6	6	1	6	4	4

EXPERIMENTAL GROUP 2. UNIT TWO. THE IRON AGE. WRITTEN EVIDENCE

NAME	NVR BD	ARTEFACT			PICTURE			DIAGRAM			MAP			WRITING		
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
M.Hon	135	7	7	8	9	8	8	8	8	6	9	8	9	8	7	9
M.F.	129	9	9	5	9	9	5	8	8	8	9	9	6	8	8	8
F.B.	125	8	8	7	7	8	5	8	9	7	8	9	0	8	9	6
S.K.	115	8	4	5	6	7	6	3	4	2	8	6	6	7	2	6
A.W.	128	8	7	8	7	8	7	9	8	6	7	7	4	8	7	6
L.W.	111	5	4	1	2	4	2	3	5	4	6	4	4	3	3	4
P.C.	114	8	8	6	8	7	6	8	9	2	8	6	4	5	6	5
M.S.	120	8	8	4	8	7	6	7	7	7	6	8	8	9	6	8
J.G.	120	8	8	4	8	8	6	10	8	6	9	6	7	9	7	4
D.F.	120	8	8	8	8	8	5	10	8	7	8	9	7	9	8	9
K.C.	111	9	8	4	8	8	4	6	2	4	5	8	4	8	8	1
R.L.	105	8	8	5	8	8	5	8	6	5	3	0	4	8	8	4
R.F.	105	2	1	1	3	6	4	5	5	5	3	5	2	8	4	4
N.T.	88	7	6	3	8	7	4	9	6	8	8	6	5	7	8	5
K.G.	99	1	1	1	6	8	4	4	8	2	8	2	6	6	7	1
M.H.	108	7	7	5	6	7	0		a		6	0	0	7	7	2
S.W.	102	3	4	5	4	3	4	4	2	4	0	2	4	1	2	1
F.F.	91				5	4	2		a		2	0	0	4	4	4
J.H.	100	9	7	5	7	0	4	6	5	6	8	6	4	7	5	4
J.K.	88	7	8	6	7	7	6		a		8	5	7	8	6	6

CONTROL GROUP. UNIT TWO. THE IRON AGE. WRITTEN EVIDENCE

NAME	NVR BD	ARTEFACT			PICTURE			DIAGRAM			MAP			WRITING		
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
L.M.	136	5	5	5	5	7	4	5	4	4	8	7	2	7	7	1
C.S.	136	8	6	2	5	5	6	7	7	2	1	2	6	4	6	5
C.J.	133	6	7	4	8	5	5	7	8	5		a			a	
B.P.	129	3	2	5	4	7	4	5	5	6	7	4	4	7	5	4
S.J.	127	6	5	3	8	7	6	7	5	5	7	2	2	3	8	4
J.W.	122	2	7	6	7	7	6	7	4	5	7	5	2	4	2	5
L.B.	119	4	6	4	5	4	4	6	4	4	6	7	1	6	6	4
P.C.	115	7	5	2	7	7	4	5	4	5	7	8	2	8	5	4
N.C.	114				4	7	4	5	5	2	5	7	6	5	5	5
F.S.	113	7	2	3	2	2	1	1	6	1	1	7	4	6	2	4
J.C.	107	1	4	1	3	2	5	2	3	2	1	5	2	3	4	5
T.W.	107	6	1	3	5	6	5	1	6	6	4	5	6	4	6	6
D.He	106	2	3	4				5	6	4	6	4	1	3	4	0
A.R.	106	2	4	0	0	6	3	3	5	3	5	5	0	4	4	0
D.Ha	105	5	3	3	7	5	3	3	6	4	2	2	2	3	4	5
F.S.	105							1	6	1	3	5	1	6	3	2
N.L.	104	2	2	3	6	6	1	7	6	6	1	7	6	7	6	5
M.B.	95	4	6	4	4	7	1	7	3	3	8	4	6	6	8	0
G.R.	87				2	4	0	3	0	0	3	4	1	3	5	4
K.D.	75				3	0	0	1	0	0	0	0	0			

EXPERIMENTAL GROUP 1. UNIT 4. THE SAXONS. WRITTEN EVIDENCE LEVELS

NAME	NVR BO	ARTEFACT TEST Qu.			PICTURE TEST Qu.			DIAGRAM TEST Qu.			MAP TEST Qu.			WRITING TEST Qu.		
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
J.B.	102	7	8	6	8	6	7	8	9	7	8	7	4	4	4	2
E.S.	129	9	9	6	9	9	6	8	7	7	8	9	6	9	8	9
H.G.	129	6	8	8	7	7	7	7	8	7	7	7	2	7	6	7
G.P.	133	8	5	8	7	8	8	9	8	5	9	8	5	7	7	7
C.Lid	86	9	8	6	7	7	7	8	6	7	8	7	6	7	7	5
K.M.	116	5	5	7	6	7	7	4	7	7	7	7	6	7	8	
P.K.	105	6	8	6	4	8	4	4	7	5	5	5	5	5	4	5
M.L.	102	8	6	6	8	8	7	8	8	5	9	7	4	7	5	6
H.C.	97	4	2	2	8	7	6	7	6	5	7	6	3	8	7	5
S.H.	104	6	9	9	9	9	9	7	7	8	7	9	8	8	7	6
I.W.	123	10	8	7	9	9	7	7	8	6	8	8	8	9	8	4
C.L.	122	7	7	8	7	8	6	7	8	4	7	5	6	4	7	7
R.D.	102	6	5	6	7	6	4		a		9	2	2	2	6	4
C.B.	96	9	8	6	8	8	6	7	8	6	8	7	6	3	8	7
D.S.	88	6	8	7	5	8	7	8	8	6	5	7	8	5	8	7
R.L.	107	9	7	5	8	8	5	7	5	5	7	5	1	6	6	4
J.W.	117	5	6	5	5	7	6	7	7	6	6	7	6	5	4	4
B.K.	88	7	9	5	8	8	9	5	6	4	7	8	7	7	4	2
N.H.	105	9	8	6	9	7	5	8	7	5	7	7	0	0	9	0
G.B.	80	3	4	0	4	0	0	4	4	0	3	2	2	1	2	1

EXPERIMENTAL GROUP 2. UNIT 4. THE SAXONS. WRITTEN EVIDENCE LEVELS

NAME	NVR BD	ARTEFACT TEST Qu.			PICTURE TEST Qu.			DIAGRAM TEST Qu.			MAP TEST Qu.			WRITING TEST Qu.		
M.H.	135	6	6	8	9	9	7	8	8	9	9	9	9	6	6	7
M.F.	129	8	8	9	9	8	6	8	8	8	9	8	7	9	8	7
F.B.	125	7	8	6	7	6	7	7	8	7	2	7	6	8	7	5
S.K.	115	7	7	2	6	8	7	5	8	6	2	7	6	8	8	6
A.W.	128	9	7	6	8	7	7	9	8	7	9	9	8	9	8	6
L.W.	111	4	5	6	7	7	7	3	3	4	5	7	6	3	5	4
P.C.	114	7	8	7	7	7	4	5	6	7	9	4	7	8	7	8
M.S.	120	9	8	9	7	9	8	8	9	4	7	9	8	8	9	8
J.G.	120	6	7	5	8	8	5	9	9	7	10	9	9	8	5	8
D.F.	120	9	8	8	10	8	7	9	9	8	7	8	9	8	8	9
K.C.	111	8	8	5	8	a	7	9	6	7	7	6	6	8	8	8
R.L.	105		a			7			a			a			a	
R.F.	105	7	6	5	8	6	7	5	7	7	6	5	7	8	7	7
N.T.	98	8	7	5	8	4	2	7	7	7	8	7	4	9	8	7
K.G.	99	8	8	6	7	6	0	8	7	5	2	6	4	2	2	1
M.H.	108	6	0	0	7	4	6	4	5	3	4	0	5	8	4	4
S.W.	102	5	4	2	6	7	4	3	3	0	4	10	0	2	0	0
F.F.	91	5	5	0	9	6	5	5	4	5	7	7	5	3	6	5
J.H.	100	9	6	6	8	7	4	8	7	4	9	7	7	8	8	7
J.K.	88	9	8	7	7		5	7	7	6	8	8	8	9	8	9

CONTROL GROUP. UNIT 4. THE SAXONS. WRITTEN EVIDENCE LEVELS

NAME	NVR BD	ARTEFACT TEST Qu.			PICTURE TEST Qu.			DIAGRAM TEST Qu.			MAP TEST Qn.			WRITING TEST Qu.		
L.M.	136	4	8	6	4	7	6	6	8	5	8	8	7	6	6	5
C.S.	136	5	7	2	7	8	4	9	6	7	3	6	5	5	7	8
C.J.	133	4	9	5	7	8	5	8	8	6	7	7	7	7	7	5
B.P.	129	2	8	5	6	5	5	6	5	6	7	7	5	5	8	5
S.J.	127	8	8	5	2	8	5	6	8	6	8	7	9	7	7	5
J.W.	122	2	8	8	6	5	6	5	6	4	7	7	5	7	7	5
L.B.	119	7	7	5	4	5	7	9	8	7	5	7	2	7	7	6
P.C.	115	7	6	6	5	4	6	6	4	4	7	7	5	8	6	6
N.C.	114	3	6	6	3	7	0	3	8	2	5	6	2	7	5	5
F.S.	113	2	5	5	7	8	5	2	6	5	7	4	8	5	8	5
J.C.	107	1	2	6	6	6	6	4	2	5	3	2	2	7	6	5
T.W.	107	4	6	1	5	6	4	3	3	2	7	5	7	5	9	7
D.H.	106	4	7	6	6	4	5	5	7	5	7	3	2	4	5	2
A.R.	106	4	4	5	7	6	0	7	4	4	7	6	1	4	6	5
D.Ha.	105	4	7	4	7	6	5	4	6	4	5	7	1	5	4	4
F.S.	105	2	6	4	7	7	5	0	0	0	a	a	a	a	a	a
N.L.	104	4	6	6	4	6	6	7	7	5	7	2	1	6	5	5
M.B.	95	a	a	a	a	a	a	2	6	5	6	6	7	7	7	6
G.R.	87	4	6	4	4	3	0	7	7	0	3	6	2	5	8	2
K.D.	75	3	6	5	0	0	0	6	4	0	1	0	0	3	3	2

Appendices XLVIII-L show how the children in the experimental groups considered how the evidence given in the tests at the end of each unit was made and used and that this involves suggestions about the thoughts and feelings, values, social structure and beliefs of the people who made and used the artefacts, pictures, sites and writing. Brief extracts of children's statements are given which loosely reflect each category. Extracts from control group answers are also given. (N.B. The 'f elings' columns should, arguably, precede the 'thoughts' columns, as discussed in Chapter One (A2 (i)).

UNIT ONE	How was it made?	How was it used?	What thoughts may it reflect?	What feelings may it reflect?
Test 1 Paleaolithic Axe Heads	Flint was mined.... They are carved. Some sharp, some blunt. Different sizes. Different shapes.	Chop trees. Chip flint, make tools, kill animals, clean skins, used for different purposes.	Fire made by flints kept them warm. Skins, scraped, kept babies warm. Hard work to find right stones. How were they cured if animals hurt them?	They had to remember, practice, help each other, pass on skills, be patient, specialise skills, remember seasons.
Test 2 Cave Painting	Done by 'chalks' - oxides. Kept oxides stored in pots? What did they paint with? Hands?		They made cave look 'comfortable' 'cosy'. They must have been frightened of the big mammoths.	They hunted ∴they were cunning. Had to observe the buffalo, store their ideas, share ideas.
Test 3 Diagram of Stone Circle	Two kinds of stone - probably found in river. Dug holes. Made pulleys out of skins?	War dances? Trade flints? Pray? Tell time? Meetings? Parades? Fort? Bury treasure?		Choosing different things (2 kinds of stone). Monument to brave warriors?
Test 4 Map of Site where S.A. implements found.		Huts on top - drained, flat. Made pots? To get water? Plants for medicine. Probably went fishing. What were flint implements used for?	Fuel is on top and the steep slope to the water would be muddy - difficult to walk down.	Chose this place because selected things to use: clay flint.
Test 5 Petroglyphics	Had things to draw with.		They needed other people.	Meaning of signs? Message? Warning? Ceremony? Stories? Relationship of writing to painting? Had language Could write, talk. Communicated. Had to teach each other. Co-operate.

What values may it reflect?	What social structures may it reflect?	What beliefs may it reflect?	CONTROL Group
Had skill. Could fight, hunt, cook. Good 'craft makers'. Had begun to "take pleasure in themselves." "They could decorate things."	Were they invented by an 'elite' group? The black, smooth one could be for a chief's wife.		
Were they interested in people more than animals?	Did someone teach them to hunt? They must have helped each other to do the paintings. Ritual?	Tribal sign? Animal 'gods'? Power over animals? Tribal secret?	
	To commemorate a brave chief? They co-operated.'.they were a community. Rival tribes?		Reference to Druids, mistletoe, magic.
Maybe they 'measured' water. It could be a luxury.	Nomadic or a settlement?		Men hunted, children scraped skins, women cooked. The men had a hard job.
Clever at communicating to get ideas around.	Guess they did not argue about meaning; there was a head man. Maybe special cook in each family. Maybe different countries had different signs, stayed in one place.		Maybe they had smoke signals to contact people.

Appendix IL

UNIT TWO

	How was it made?	How was it used?	What thoughts may it reflect?	What feelings may it reflect?
Test 1 Waterloo Helmet	Smelt iron and bronze with charcoal. Mould. Make rivets. Print patterns. By one group?	Protection in battle? Ornament?	Fierce. Not afraid of battle. What did it feel like on? Heavy?	Knew how to learn, to invent things.
Test 2 Uffington Horse	Grass was cut away to show chalk, with tools	Is it where they trained horses?		Skilful, artistic, hard-working.
Test 3 Diagram of Iron Age Hut plan.	Did they sharpen the posts?	Compartments between posts for storage? hiding? sleeping chambers?	Did children play around the posts? Warm their clothes by the fire? Did they sleep in skins? Were they itchy?	
Test 4	They cross-ploughed fields, on the side of the hill - protected, drained.	Ploughed fields. Grew corn? peas? Kept animals?		Understood 'agriculture'. How long did it take to invent a cart?
Test 5 Strabo extract		Have domesticated dogs and cattle. Farm. . have corn milk, butter, meat, leather.		Had written language. How long after Romans til I.A. could write? There are different languages at different times. Communication was important.

What values may it reflect?	What social structures may it reflect?	What beliefs may it reflect?	CONTROL Group
atterns may mean 'long live our tribe', or describe the wearer's qualities, or convey 'magic' ower. What did they fight for? Food?	Is it ceremonial? A symbol of rank? A trophy? Do patterns show what side you are on? Medal? Awarded for bravery?	Found in Thames .°.could have been an offering to a water goddess.	
Symbolises power over things beyond their control? To show off? To scare another tribe?	Ceremonies? Customs? Social organisation needed to make it....	Offering to a goddess? To frighten spirits away? Bring good harvest? They believed something had power over them?	They worshipped the horse.
	Is it the chief's hut? It's large.		They built houses and ladies thatched the roof. Women told the children to make the fire.
	low much land belonged to one person? Was it fair? Who owned it? Families? Was the road for special people? Th y had me kind of laws. Maybe the fields were independ-ently owned according to rank. How much bel nged to one person? Did they have the same amount? Do tracks s parate own rship?	id t ey not use the horse to plough because it was some kind of God?	
	Did one family have monopoly of exports? Or one region? Organisation was needed to trans-port and sell goods. Need for forward planning. Job specialis-ation? Role of slaves?		Did women go to war? Or chop wood? What did the children do?

UNIT FOUR	How was it made?	How was it used?	What thoughts may it represent?	What feelings may it represent?
Test 1 Sutton Hoo Sceptre	of stone/ metal. 'It's unique?'		Deer may be saying 'save our lives?' Maybe they wanted good luck because they were always fighting.	
Test 2 Illuminated Manuscript	Deductions about corn, longs, storage, transport.		Must have worked long hours - hot in summer - heavy loads, bent backs.	Tell the months of the year - Had imagination. Had literature.
Test 3 Plan of Anglo-Saxon Church	Roman style..	What did they do in church? Was there a chapel for the children - the old? Did the priest wear tatty or braided robes? Were there processions? Songs? Did they have meetings?	Would there be an echo in the church?	Took a long time to build ..they worked hard for something they really wanted.
Test 4 Map. Croydon area in Saxon times.		Did they travel in carts? - large, slow....	Good soil and water supply.. they probably lived happy kinds of lives although they fighted. I wouldn't go down the valleys at night!	Did they send someone ahead to find a good place? They must have transferred to smaller boats. ..they planned ahead.
Test 5			B. is to insire courage/loyalty. They could have been scared. I guess the Saxons were brave. He is a symbol of fighting. We'd greet people on the road but the Saxons would have their weapons ready. They might have killed a monster but not like that. It describes how they feel.	They wanted more land for their crops so they fighted. They must have been glad. B. liked fighting.

What values may it reflect?	What social structure	What beliefs may it reflect?	CONTROL Group
It is a symbol- it has something to do with animals.	Maybe the ruler carries it to say he is the ruler on God's earth. They had kings. They had to be obedient/ loyal. It is a symbol of power or to make people think he has power, and he thinks he has power over people's minds. The succession? G ft from the Government? A reward?	Maybe it (the deer) commemorates the beginning of earth?	Only the rich could have one. The poor must have been green with envy.
	Shows jobs people do and relationship between them. Probably people do different jobs. Probably traded for money. Man on the left is probably the leader.		The man on the left is in charge.
	Who paid for it? Was it built by the lord - if so he must be powerful.	Was there a graveyard? Did they bury the dead?	Saxons were religious. A lot of Saxons believed in God. It was probably dark and smelly inside.
	Croydon had a river and a spring. ∴ Did it have a bigger population?		The springs probably caused flooding, but they'd have a good supply of roach. Did the women get the water? How did they get around in the snow?
B. was a warrior. He could be a lesson to the people, and have a meaning.	They probably had people who could write and others could not. Some people might write for the rich people.	B. was under God's power and might have God's power and feelings in him. Did he hang up G's arm because he thought a spirit might claim it?	B. was macho. I guess their stories are all fierce stories.

APPENDICES LI - LVI

Synopses of Led and Unled Discussions. Unit One. The evidence is given in Appendices XIV - XVIII.

Appendix LI — Test 1. Flint Hand Ax s 2,000 B.C.
(i) Led Discussion (Ex . 1)
(ii) Unled Discu si n Ex . 2)

Appendix LII — Test 2. Cave P in ing.
(i) Led Discussion xp. 1)
(ii) Unled Discussi n Exp. 2)

Appendix LIII — Test 3. Plan of a Stone Circle
(i) Led Discussion
(ii) Unled Discussi n

Appendix LIV — Test 4. Map of N rth Downs showing where neolithic implements found.
(i) Unled Discussion (xp. 2) (Led Discussion is giv n on p. 115-116).

Appendix LV — Te t 5. Petro lyph cs.
(i) Led Discussion (Exp. 1)
(ii) Unled Discuss on (Exp. 2)

Appendix LVI — Extract from a Transcr pt of Unled Discussion xp. 2) of the Plan of a Roman Villa (Appendix XXVI) Unit Three. Test 3.

UNIT ONE. EXPERIMENTAL GROUP 1. TEST 1 Flint Hand Axes. Led D'scussion Ta e

1	2	3	4	5	6	7	8	9	10
What do you know?		They're flint			∴				
	P. ite bits and chalk →	No. It's where they're worn. Flint Hand Ax s				Knew how to make them. They used tools			
					2				
			P. D d they trade the flint they had over?						
			They could have cut up wood with the tools		→	and made other things. They must have expla ned to others how to make them. They were intelligent.			
						They had control over their hands.			
					.˙.	They must have kept on making t em, to replace them.			
						No, they could sharpen them like pencils.			
			P. Would they trade the flint for money, or get another type of flint back?			They may have shared jobs - one mad the handle and one made the blade.			
	P. If a mother has a baby - was the flint like that?...					They learned and explained things.			
			skills developed gradually		→	They had to concen rate			
			They could kill animals		→	.˙. They could kill people who threatened them too.			

1	2	3	4	5	6	7	8	9	10

GUESS?

They're differe t sizes a d shapes → They might have differ nt weapons for different animals.

T ey might have been found at Grimes Graves - or chalk areas like the while cliffs of Dover.
- or on a chalk and flint hill in Kent, or in our Bird Sanctuary.

P. Or anywhere if you dig deep enough

They may have got the flint from the roots of an uprooted beech
- or by digging for it.

∴ They either lived in the place where they were found or they travelled throu h it and dropped it. → They might have been nomadic - they travell d around looking f r flint to cut down trees, and to f llow the animals.

Qu. 3 Why did th y change?

Did the ice make the flint harder?

Dıd they make ice axes ın t e ice age?

Dıd they have other sorts of we pons besıdes th s ?

This might te l m what animals th y killed - if there were specific weapons for diffe ent animals.

id they m ke thin s out of stone for cooking?

UNIT ONE. EXPERIMENTAL GROUP 2. TEST 1. Flint Hand Axes. Unled Discussion

1	2	3	4	5	6	7	8	9	10

P. 5 axes →

M. 11 actually. 5 small and 6 big.

J. It looks lik wood. It's highly polished.

P. It's dogwood to make daggers not like yew. Yew bends too much

P. The things at the back are just like aeroplanes → J. Arrow heads, actually → P. They're very sharp. They had good skills. They'd cut your finger. →

J. They were all chipped and smoothed from a big lump of flint.

P. The one that looks like the d wood one is a small r version for a special reason

P. The black one looks like glass or metal. It looks like a sheeps head - or bull - an aeroplane →

P. The thin one is good for a spear. The arr w head has a very sharp point. They're diff rent sizes. →

J. Actually, they can all be used as h nd axes - to whack down trees.

P. I really <u>like</u> t i ne. (several times).

P. They actually thought about what the bl n ne would do.

N. I li e the one in the middle. It's smoothed nicely.

M. Like wings on a bird.

J. Like a hang glider.

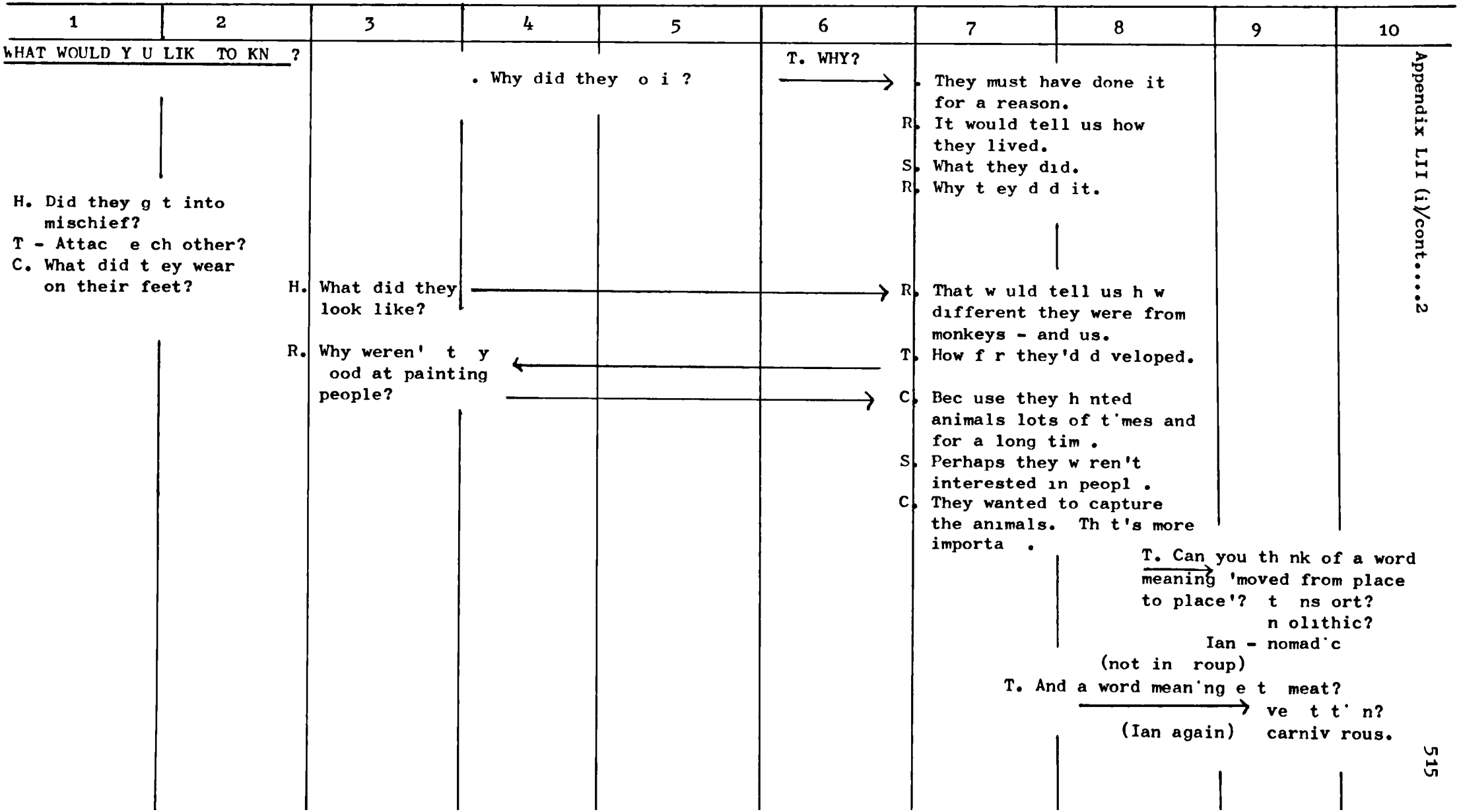
N. I think the flint on the left is shaped nicely and smo thed off nicely.

UNIT ONE. EXPERIMENTAL GROUP 1. TEST 2. (Picture) Cave Painting. Led Discussion

1	2	3	4	5	6	7	8		1
WH T DO Y U KN ?		R. They had anim ls. A. They could paint.	T. They were fierce an'mals. A. It took a lot of skill to draw them →			T. What skills? A. They had to remember their shape. C. H d to practice H. A steady hand. T. Helped each other. Passed on skills.	T. Is ther a word to describe these skills? → Sharing Hel ing Caring		
			C. They painted with oxides - metals in the soil →			A.*.They could make differe t shades from soil in different areas. -They must have had something to paint with.			
		T. There are Buffaloes, a Bull, a Mammoth. - horses		T. Wh t does th s tell us? →		R. The an'mals might eat the people. T. What else might t ey eat? Plants.	T. Wh t w rds describe and weather? → Climate V g tatıon		
WHAT CAN YOU CUE ?			A. They used the skins to catch other animals. R. For c mouflage S. They used to ls to kill anim ls						
			T. Not to ls → R. eapons →			C.*.They used the sk'ns to protect their hands when they m de flint tools and weapons.			
				H. An for clothes. ←					

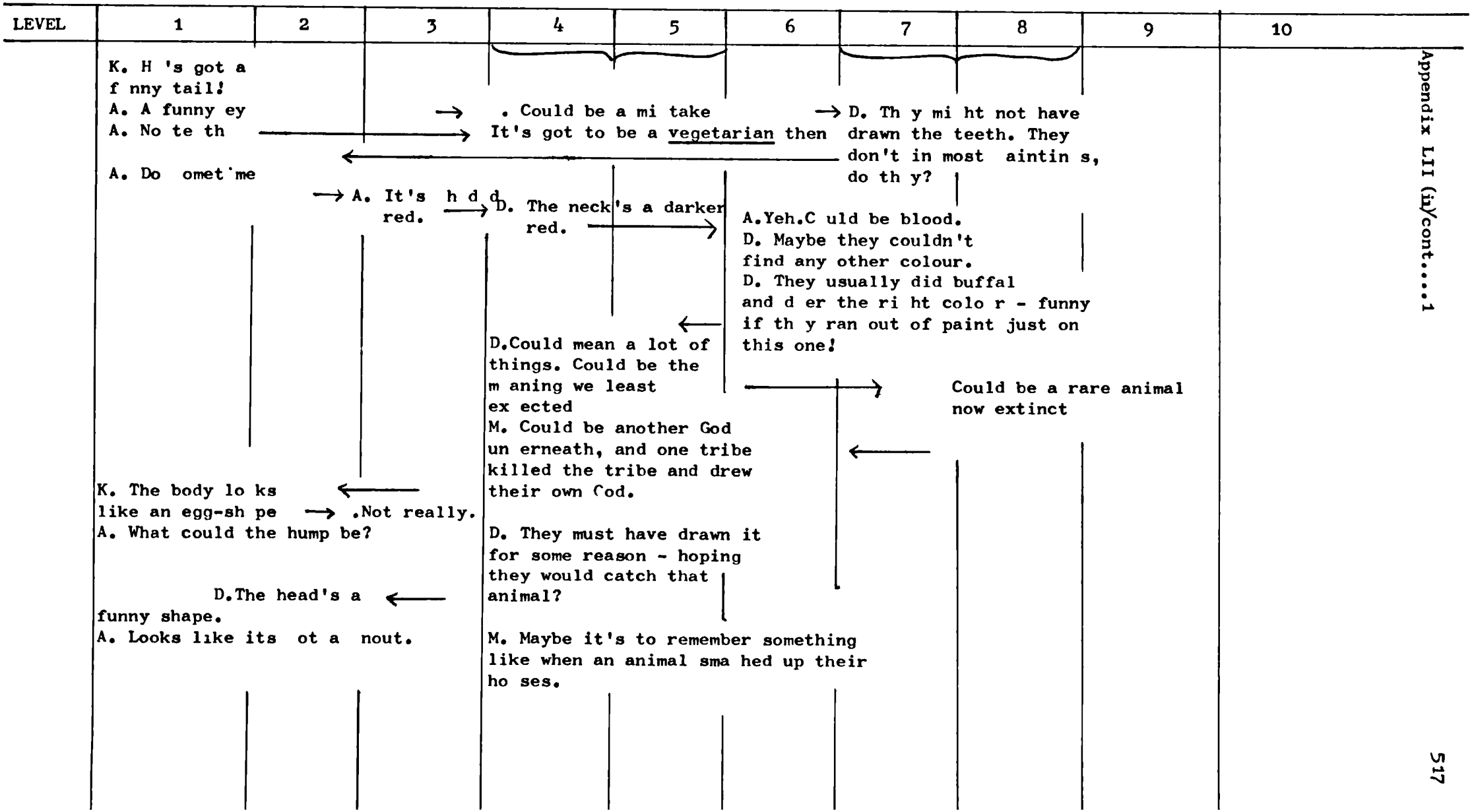
Appendix LII (i)

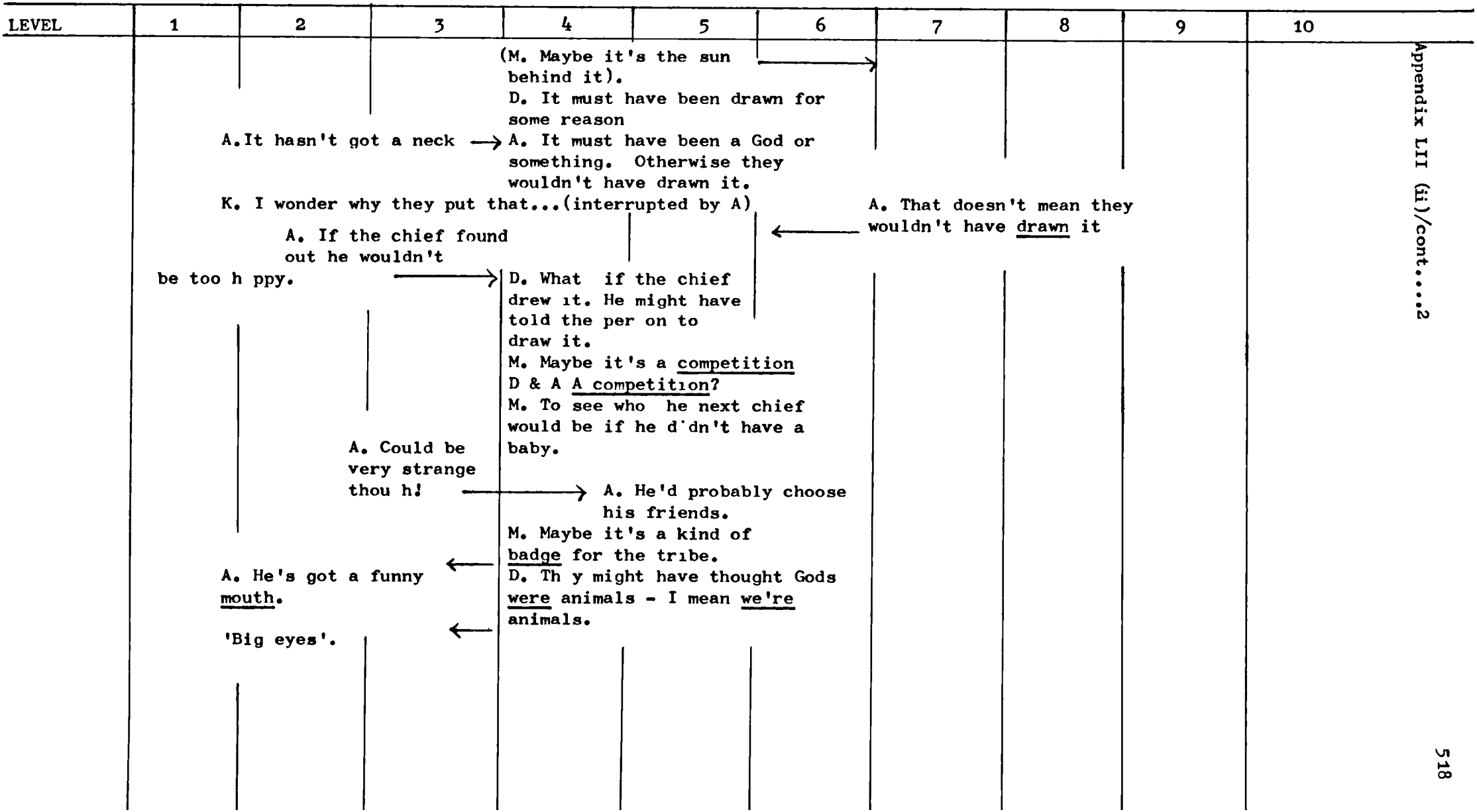
1	2	3	4	5	6	7	8	9	10
			They probably ate the meat		→ C.•.They could probably cook				
					H. They had to set u co king things in their camps.				
			C. They could have used th tus s to paint.						
			H. To put oxides in						
			- or us d feathers						
			- or fin ers.						
			S. Or ticks.						
			H. Or bones.						
	T. Why d d t ey do the painting? →		As a sign						
	T. Wh t of →		. Bec use they enjoyed painting.						
			H. To keep a s cret.						
			To do an 'antler d nce'.		→ A. To get power over the animals.				
			. To get the animals to come closer.		C. Or t lure them into the c ve.				
					- or to keep t e secr t from rival tribe .				


1
2
3
4
5
6
7
8
9
10
WHAT WOULD Y U LIK TO KN ?
H. Did they g t into mischief?
T - Attac e ch other?
C. What did t ey wear on their feet?
. Why did they o i ?
T. WHY?
. They must have done it for a reason.
R. It would tell us how they lived.
S. What they did.
R. Why t ey d d it.
H. What did they look like?
R. That w uld tell us h w different they were from monkeys - and us.
R. Why weren' t y ood at painting people?
T. How f r they'd d veloped.
C. Bec use they h nted animals lots of t'mes and for a long tim .
S. Perhaps they w ren't interested in peopl .
C. They wanted to capture the animals. Th t's more importa .
T. Can you th nk of a word meaning 'moved from place to place'? t ns ort?
n olithic?
Ian - nomad'c
(not in roup)
T. And a word mean'ng e t meat?
ve t t' n?
(Ian again)
carniv rous.

UNIT E. EXP RIMENTA ROUP 2. TEST 2. (Cave Painting) Unled Taped iscus i n

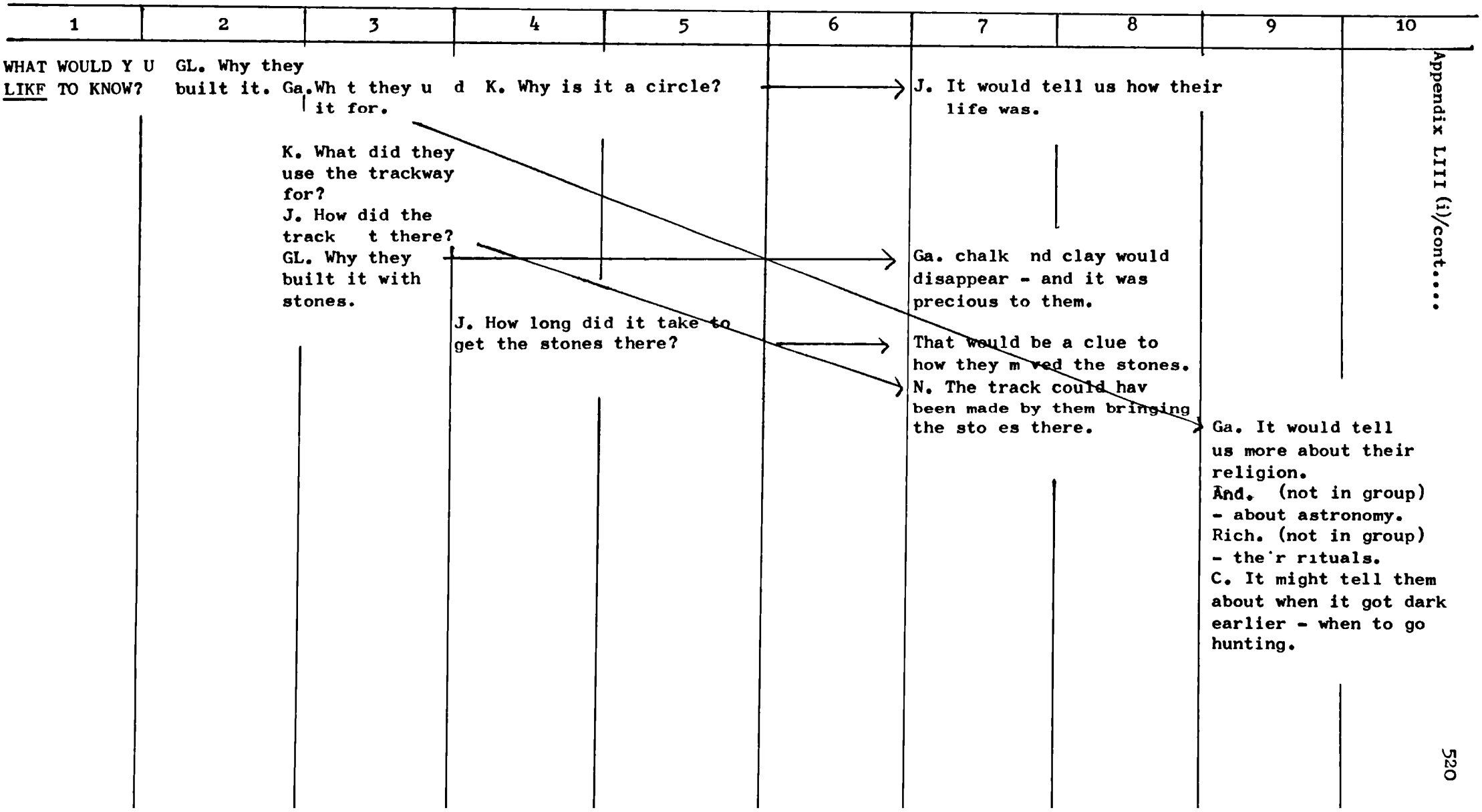
LEVEL	1	2	3	4	5	6	7	8	9	10
Kylie Butcher M. Han'fa Kelly H D niel F Andrew W	A. Funny lookin . I wonder wh t it is?	D. lo ks like a b ffalo - sh rp horns M. M ybe it's a spe r A. It's got 2 heads A. It can't be a buffalo. It's got a g e t hump. A. A camel it l oks l ke. A. That lo ks like a c m l. A. Maybe it's a b ffalo. Then it went wr ng so hey ch n ed it into a camel.	A. What do you m an? You don't get spears as bendy as that. M. Maybe it's bent be ause t hit it with such force D. That could be a t il. . A bit thick for a tail. M. Maybe as a G d. D. Buffalo do, don't they? They have 2 I thought. D. It couldn't be a cam l. M. No. Can ls are mu tal er. M. M ybe it's imagin ry M. It lo ks like s ding on it's neck - l'ke as if the light's behind it.							


LEVEL
1
2
3
4
5
6
7
8
9
10
K. H 's got a f nny tail!
A. A funny ey
A. No te th
. Could be a mi take
It's got to be a vegetarian then
D. Th y mi ht not have drawn the teeth. They don't in most aintin s, do th y?
A. Do omet me
A. It's h d d red.
D. The neck's a darker red.
A.Yeh.C uld be blood.
D. Maybe they couldn't find any other colour.
D. They usually did buffal and d er the ri ht colo r - funny if th y ran out of paint just on this one!
D.Could mean a lot of things. Could be the m aning we least ex ected
M. Could be another God un erneath, and one tribe killed the tribe and drew their own God.
Could be a rare animal now extinct
K. The body lo ks like an egg-sh pe
.Not really.
A. What could the hump be?
D. They must have drawn it for some reason - hoping they would catch that animal?
D.The head's a funny shape.
A. Looks like its ot a nout.
M. Maybe it's to remember something like when an animal sma hed up their ho ses.


LEVEL
1
2
3
4
5
6
7
8
9
10
(M. Maybe it's the sun behind it).
D. It must have been drawn for some reason
A.It hasn't got a neck
A. It must have been a God or something. Otherwise they wouldn't have drawn it.
K. I wonder why they put that...(interrupted by A)
A. That doesn't mean they wouldn't have drawn it
A. If the chief found out he wouldn't be too h ppy.
D. What if the chief drew it. He might have told the per on to draw it.
M. Maybe it's a competition
D & A A competition?
M. To see who he next chief would be if he d'dn't have a baby.
A. Could be very strange thou h!
A. He'd probably choose his friends.
M. Maybe it's a kind of badge for the tribe.
A. He's got a funny mouth.
D. Th y might have thought Gods were animals - I mean we're animals.
'Big eyes'.

UNIT ONE. EXP RIM NTAL GROUP 1. TEST 3. DIAGRAM (Stone Circle). Led Discus ion

1	2	3	4	5	6	7	8	9	10
What do you KNOW?		Ga. There's an opening in the circle - an entrance	It was hard for t em to carry the stones.			J. They had some kind of transport. GL. It took a lot of people to carry them. Ga. They must have made it for a reason			
		K. It's a circle. G. ome stones are smaller than others.				A. (not in group) They un rstood		diameter N. They knew about	g om try
What c n you GUE ?			K. They traded flin s here. Ga. What they used it for.			J. They had markets - or parades. Ga. - meetings C. It's a burial place.			
			GL. The stone may be flint.			J. They could have pulled the flints with horses.			
			Ga. The bank could be rubb'sh and mud.			K. They could have made it with flints. C. Dug it with sticks. J. Put the mud in pottery bowls G. Or used their hands.			
			Ga. Perhaps they made magic there K. Or used it f r praying Ga. Or killing animals.			K. They could have made a skin bag to put the stones in. Ga. - Yes. Out of animal skins.			
			Ga. the trackway go s on past the entrance			J. Perhaps it was the trackway for the tribe		Ga. They could co-operate J. There was a c mmunity.	
			N. Perhaps they brought stones alon the trackway.						


1
2
3
4
5
6
7
8
9
10
WHAT WOULD Y U LIKE TO KNOW?
GL. Why they built it.
Ga. Wh t they u d it for.
K. Why is it a circle?
J. It would tell us how their life was.
K. What did they use the trackway for?
J. How did the track t there?
GL. Why they built it with stones.
Ga. chalk nd clay would disappear - and it was precious to them.
J. How long did it take to get the stones there?
That would be a clue to how they m ved the stones.
N. The track could hav been made by them bringing the sto es there.
Ga. It would tell us more about their religion.
And. (not in group) - about astronomy.
Rich. (not in group) - the r rituals.
C. It might tell them about when it got dark earlier - when to go hunting.

UNIT ONE. EXPERIMENTAL GROUP 2. TEST 3. DIAG AM. Unled D'scussion

1	2	3	4	5	6	7	8	9	10

K. S me circles have no ditch but this one h s.

R. For defence?

Jam. There are 55 stones.

K. They may have pulled them there with rope.
M. Vines?
Jam. Or put them on logs tied together - and dragged them across rivers -
K. Perhaps there is a ditch because this circle was attacked more than others.

M. Maybe 'Henge' means a tribe or a burial ch mber.

Ra. Most unlikely though!

M. There are two entries - one falls S. . - and an axe and flints. The cross might mark the centre.

J. They could have used that to find - what's the word?...The d ameter!

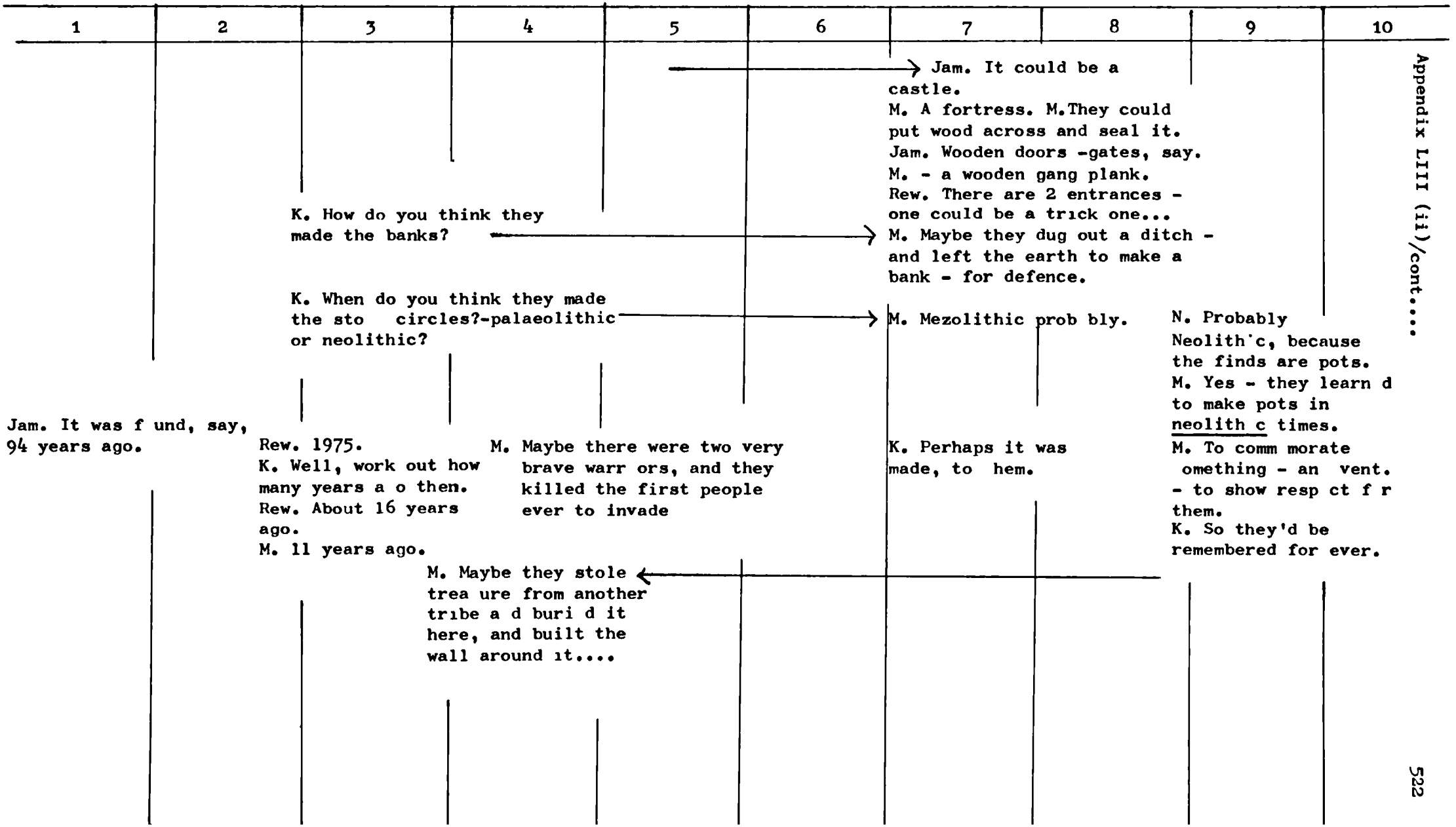
M. It's the diameter in feet.

K. What does '10m' mean?

M. It could be graves - or the place where they buried the'r treasure. - or when the chief died he was placed here with his wife perhaps.

K. What about the bank?

It's a protection sort of thing.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Jam. It could be a castle.
M. A fortress. M.They could put wood across and seal it.
Jam. Wooden doors -gates, say.
M. - a wooden gang plank.
Rew. There are 2 entrances - one could be a trick one...
K. How do you think they made the banks?
M. Maybe they dug out a ditch - and left the earth to make a bank - for defence.
K. When do you think they made the sto circles?-palaeolithic or neolithic?
M. Mezolithic prob bly.
N. Probably Neolith'c, because the finds are pots.
M. Yes - they learn d to make pots in neolith c times.
Jam. It was f und, say, 94 years ago.
Rew. 1975.
K. Well, work out how many years a o then.
Rew. About 16 years ago.
M. 11 years ago.
M. Maybe there were two very brave warr ors, and they killed the first people ever to invade
K. Perhaps it was made, to hem.
M. To comm morate omething - an vent. - to show resp ct f r them.
K. So they'd be remembered for ever.
M. Maybe they stole trea ure from another trıbe a d buri d it here, and built the wall around ıt....

UNIT ON . EXPFRIM TAL GROUP 2. T T 4. M P. Unled Dıs ussi n

1	2	3	4	5	6	7	8	9	10

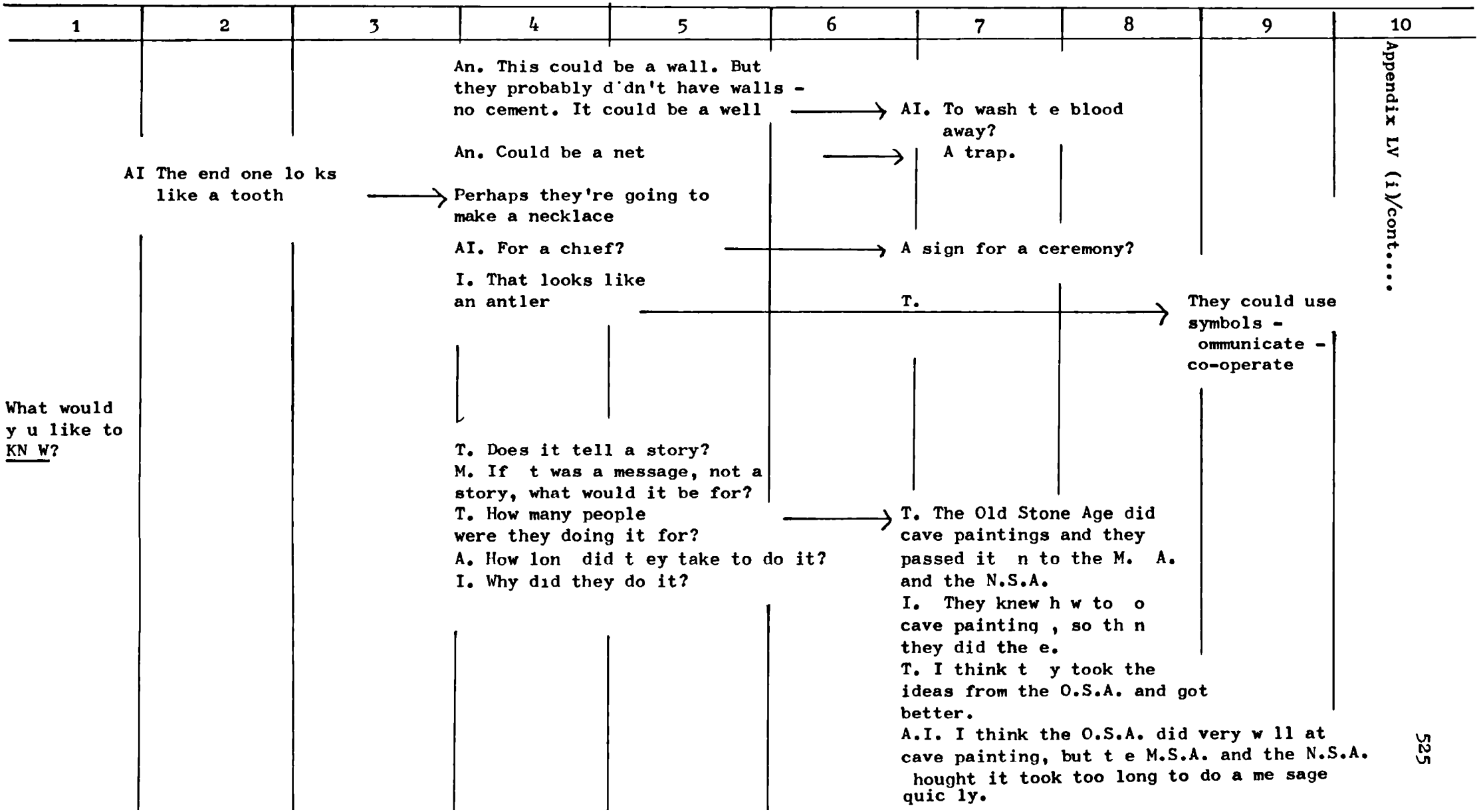
There's cl y at the bottom
A river -
- c lk
Do y u think Stone Ag people could live here?
Y s. → Ther 's doqwood → to make bows and arrows
nd be ri s → f r med c e
h re mu t be a lo of ch lk → It w s a ood place o live
Ch lk turns into ← t r , and a hill → so they c ld look d wn on all
paint → Th y u d ox des for paints t e an'mals
hat looks l ke a mire
The cl y is all
aro nd the rivers → Clay is alw ys around
nd the white ar rivers.
c uld e chalk.
It definit ly is → Mo t often chalk has flint
chalk - it ay so ın it

I wo der how they lived on
food?
It doesn't l ok ←→ Th t's on t e m . It may b
a very big river → in real life.
his map is
n arly all clay → I suppose th y would have a
nd chalk f w lants
and wat r.

The anim ls - y u k w h f st ←
th y o - y pr b bly amp d → But if you went to that actual
u all t ra . pl ce, and looked very
c refully - and ok the map
along - it wouldn't look like
that at all.

UNIT ONE. EXP RIM AL ROUP 1. T T 5. RI ING. Led scussion

1	2	3	4	5	6	7	8	9	10
What do you KNOW?			AI. They could communicate			→ And. They could talk t each other. J. B cause hey d ew p'ctures			
		A. Looks l ke a map and an animal.							
A. They couldn't t lk.	←		I. They had signs as well, to communicate. T. o tell each other thın s a d to help each other.						
			T. They would have helped each other - not one per on d ne it all.		→	C. They shared id as J. They left mess ge			
Wh t can you GU E ?		An. Wh t the signs mean	AI An animal nd a man m' ht mean 'going h nting'						
			I This looks like a w ll		→	.˚.it could be a 'help' sign - to help to build huts or someth'ng? T. The anim l mig t mean they n eded help oing hunting - this looks like an arrow.			
AI. Or a carrot	←								
	→		n. More lik ly an rrow. It's more to do with hunting. T. It looks lik a heart.						
Or a TV aerial	←		An. The next one looks like a tree - the wavy lines are br nc es.						
	→		All. No! - A man with no head? Maybe he's been hanged:						
			1. - A man talking. 2. - 2 people t lking.						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What would y u like to KN W?
AI The end one lo ks like a tooth
An. This could be a wall. But they probably d'dn't have walls - no cement. It could be a well
An. Could be a net
Perhaps they're going to make a necklace
AI. For a chief?
I. That looks like an antler
T. Does it tell a story?
M. If t was a message, not a story, what would it be for?
T. How many people were they doing it for?
A. How lon did t ey take to do it?
I. Why did they do it?
AI. To wash t e blood away?
A trap.
A sign for a ceremony?
T.
They could use symbols - ommunicate - co-operate
T. The Old Stone Age did cave paintings and they passed it n to the M. A. and the N.S.A.
I. They knew h w to o cave painting , so th n they did the e.
T. I think t y took the ideas from the O.S.A. and got better.
A.I. I think the O.S.A. did very w ll at cave painting, but t e M.S.A. and the N.S.A. hought it took too long to do a me sage quic ly.

UNIT ON . EXPERIMENTAL GROUP 2. TEST 5. W ITING. Petroglyphics. Unled Discussion

1	2	3	4	5	6	7	8	9	10

JK. That looks lik a bowl of soup. → It could mean dinner for the tribe

JK. The s cond one look like a scorpion. - or a person with 3 horns → SD. It could be a God.

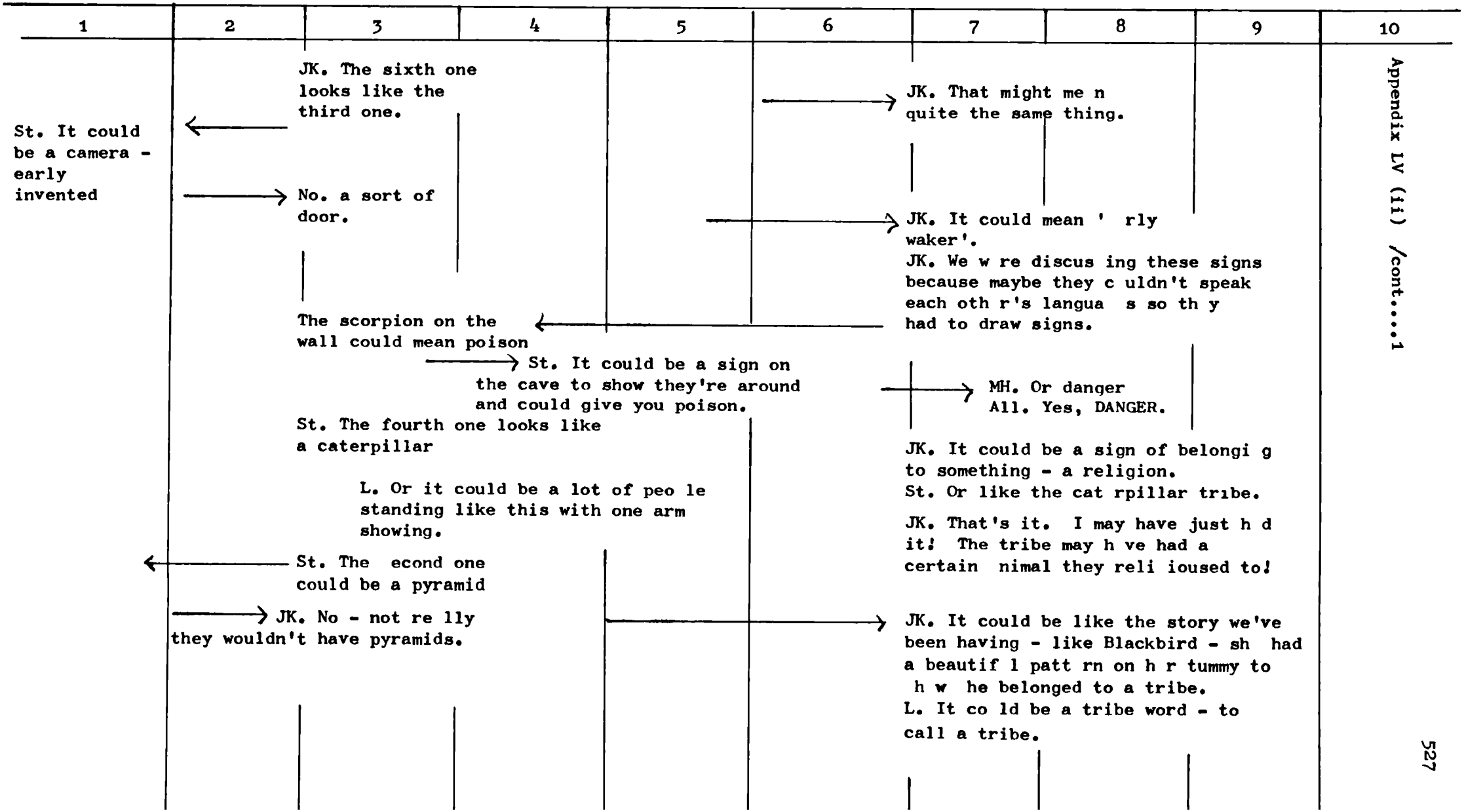
JK. What l tter in the alpha- b t looks like this? ←

SD. They didn't h ve o r alphabet.

JK. The third one l oks like a comb- or a waterf ll.
MH. Or a bed of some kind.
L. Or a tablecloth with cups
SD. Not in the Stone Age!
JK. Or a fi ld with pl u h marks.
L. The fourth one l oks like a lot of p o l sitting t gether.
St. No, a c terpill r crawl- in up a stick - or a cooking thing.
JK. The fifth one looks like a fence. t. or s ear heads.
L. Or tepees.
M. I think that as well.

→ JK. Or it could mean 'growth' or something like that

Append'x LV (ii)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JK. The sixth one looks like the third one.
St. It could be a camera - early invented
No. a sort of door.
JK. That might me n quite the same thing.
JK. It could mean ' rly waker'.
JK. We w re discus ing these signs because maybe they c uldn't speak each oth r's langua s so th y had to draw signs.
The scorpion on the wall could mean poison
St. It could be a sign on the cave to show they're around and could give you poison.
MH. Or danger
All. Yes, DANGER.
St. The fourth one looks like a caterpillar
JK. It could be a sign of belongi g to something - a religion.
St. Or like the cat rpillar tribe.
L. Or it could be a lot of peo le standing like this with one arm showing.
JK. That's it. I may have just h d it! The tribe may h ve had a certain nimal they reli ioused to!
St. The econd one could be a pyramid
JK. No - not re lly they wouldn't have pyramids.
JK. It could be like the story we've been having - like Blackbird - sh had a beautif l patt rn on h r tummy to h w he belonged to a tribe.
L. It co ld be a tribe word - to call a tribe.

1	2	3	4	5	6	7	8	9	10

JK. The seventh could be a si n to do with a God - or a body pattern.
L. Or someone's name.
M. It looks a bit like a snake → St. It looks like the thing back here. Up the other way it could be a jelly fish.
L. Or a tortoise →

JK. Looking at the 1 st one, if they had spec'al gods, they may have had special patterns to go with the gods (St. 'That's a good idea!')
Sim. - It looks like a sign for a feast.
JK. - Yes - a stew!
SD. Drawing a picture of a man could be a picture of someone who died.
JK. Like if the chief died they might ha e done pictures of him a d his tepee.
SD. They're signs →

M. It might be a sign for a ceremony.

(They then go over the possible individual meanings of each 's'gn' again, JK. playing the role of teacher and insisting on turn-taking and involving everyone. When told their half hour is over they ask if they may continue on Monday).

Appendix LVI

An extract from a discussion by Experimental Gro p 2 (unled) about the Plan of Chedworth Roman Villa. Unit Three, Test 3.

1. The bath mu t be very small
2. Why do you say that?
3. Well look, because, where it's got r om f r the bath, it's quite a small space
4. But that's only.....the plan
5. In villas, they, the baths are quite big because they got to fit quite a lot of people ın at a t me
6. No, no, thought it was one person
7. But there's a cold bath which is like a swimming pool
8. Must have been very warm because I co nte fıfteen hypocausts, so they must have been kept very warm
9. They'd need to in that big villa
10. They dıdn't have electricity to heat them, d d they?
11. There's something I'd like to know that seems r ally silly to me. If they had slaves, they've got this great big space and there's no wall at the end, and if t ey let the slaves work there, if they'd run off, they'd climb out of it or something, and escape.
12. They probably just haven't, started that bit yet
13. There wasn't a wall there
14. There's a lot of area ın the Rom n pl e
15. Yeah, most of ıt's quite large....a courtyard
16. with very big steps, but it doesn't how it from my point of view on the diagram
17. does have um, an arrow which pointe to the steps I think indicating that ıt is steps
18. There's a lot of steps really, l ok, abou half of the (indistinct) is steps
19. Yeah, up to t e hypocausts and abov
2 . The steps don't seem to lead anywhere, but t e rooms at t e top, you see they come along and it looks as if they don't lead

to anywhere because it's a gr at oblong, and, the different shape, and it leads to something like one, two, three, four, five, six, seven, e'ght, nine, ten, someth'ng like ten room

21. That 'A' must be a chur, it looks like a church because it's quite small

22. The th'ng in the to here, we don't know what it is

23. It looks like a temple

24. (several) Yeah

25. Like at Lullingstone

26. Lullingstone yeah

27. You could be mistaken because when Peter and I did a picture of Lullingstone

28. That could've been a stable

29. the bit off wasn't a temple

30. It could've been a courtyard

31. (Several pupils speak at once)

32. (Indistinct) in the middle, could've been a courtyard

33. The stable would've b en in the courtyard

34. In the, this villa looks as if it was made on a ill because um, there's a north wing, at upper level, in a u per level and south wing at a lower level

35. No, that just m ans they've got two levels and w at they've drawn the plan, and t e pl n of the north side is the high level and the plan of the other side is t e low r level, t ey've like, we've got, li e in our hous s w have two levels usually, unless it's a flat or a bung l w

36. so e's has g t four

37. What do you ha e to s y, Andrew, about th s?

38. There must have be n a lot of piping co t a lot f money

39. And I wonder who k t the hypocaust goin becau e, they di n't, the stuff that they us d to heat th hypocausts didn't go on all the time.

4 . It'd be the slaves that w s down the b ttom and, er, ke p it burning.

41. I, er, 'cos we have to stock up the coal for the coal fires, so in a way, their hypocausts were like o r c al fires only their hypocausts spread throughout the

42. house

43. The whole hou e?

44. Th se slaves must have been going around then b cause if they've got all that, all those pipes around, where are they going to put all the water in there?

45. Yeah, that's a problem

46. Pipe water in from?

47. comes in

48. There must, you know the, bit we were talkin about c uld've been a, um, sort of hut which had a well in it and th y co ld've run water from there and they could have had a sort of pump, which went into a house

49. They couldn't just do it d wn a pipe, could t y?

50. What they probably did was, to get the water own to heat along the pipes, they probably....it sounds as if

51. They suck it?

52. Yes, but they can't as I said, they can't just pour it down the pipe

53. Why?

54. Maybe it's like um, er, it's like a well you know? They used those pumps in the olden days that you pump and water comes u and it's like using that say and, into the, into the pipe, you're p m ing it into it.

55. Maybe there was a centre point 'n the hypoc st w ere th y, th y had a, um, pipe which led upwards which had a lid on it whic t ey could, pull bac the lid and tip a bucket of water into it, and it would go along the p' es and h at up in the hypocaust

56. No what t ey probably did w s use um, l t fire or som h'ng and then u e it, um, to put ro nd the pipes

57. Th t's a

58. Y ah a f'r

59. in the ground a d then as you put the pipe in, wh n t ey don't w nt it on, you can pour water in to or someth'n

60. It must have been v ry big, more t an forty feet b c se we got a chart at the bottom here

61. It ys s x feet

62. it goes past that

63. it m'ght h e been the ipe w uld c me alonq a d heat up the hot

64. maybe that took the bucket and just added a bit of hot water which would heat up all the wat r in the first place

65. It w ld t ke a bit more th n a bit of hot water

66. Quite a lot

67. Quite a bit of hot water and then once its bo'led, once it's hot then t ey'd pour it into the hy causts

68. What about the cold line(?) What ab ut the cold bath? If th y anted a warm bath, they can't just have hot w ter

69. They must h ve had

70. They mu t have had pipes

71. Two diff rent kinds

72. They might have had

73. Um, fire around it and, um, put it out or something and leave cold water to run throug it

74. Like have two different ch nnel

75. They'd be too cold if they w nted a cold bath, be way too cold to 'ust use it, little tiny bit of hot w ter in it.

76. As Mark was s ying, that ther w s no room for, was it saying, any dia r ms, H, H, H, H, M, mu t m an that th re are room n ar t e baths

77. It d s

78. bec u e whe Mark w s saying that 't doesn't show a y ıa r m f ny room .

79. I w s 'u sayi g that it n't sho any, um, in t mıd l , d,

80. l t ed

81. it sh ws alo the ed e b t n t 'n th mid le

82. th must be s m k'nd of ı in to p m h w t r i o the ba hs

83. for t e ld bath, t y need d qu't a l t.

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